

AFRES
AFRICAN REAL ESTATE SOCIETY

22nd Annual Conference

Theme:

Pathways To Sustainable Real Estate
Investment In Sub Saharan African Countries

Tuesday 12 - Friday 15 September 2023

University of Nairobi, Kenya





AFRES
AFRICAN REAL ESTATE SOCIETY

22nd Annual Conference

Theme:

**Pathways To Sustainable Real Estate Investment
In Sub Saharan African Countries**



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Compiled By:
Emmanuel Kofi Gavu, Dr.-Ing.

Table of Contents

Message from Conference Chair	
Message from Scientific Committee Chair	
Message from IRES President – Celebrating IRES/ AfRES Collaboration	
Message from AfRES President	
Message from AfRES Executive Director	
The Conference Event	
AfRES Membership.....	
List of Reviewers	
Conference Sub-themes	
Best Paper Award Categories.....	
Conference Chair	
Scientific Committee Chair	
Future Leaders of the African Real Estate Society (FLAfRES)	
Local Organizing Committee.....	
ABSTRACTS.....	1
Portfolio Diversification of Nigerian REIT: Evidence from an African Real Estate Market	2
Daniel Ibrahim Dabara ^{1*} ; Oluwafemi Timothy Ayodele ² ; Augustina Chiwuzie ³ ; Emmanuel Itodo Daniel ⁴	
Professional Perspective on Contemporary Valuation Techniques in Tanzania: the case of Hedonic Pricing Method	2
Yusuph Abdi Iddi ¹ ; Upendo Matotola ²	2
Data Management Practices among South African Construction Professionals: Implications for Industry 4.0 Technologies in Construction Practices.....	3
Timothy Oluwafemi Ayodele ¹ ; Abel Olaleye ^{1,2} ; Ayodele Adegoke ¹ ; Chioma Okoro ²	3
Gender Diversity in Real Estate Education: Evidence from an African Higher Education Institution	4
Augustina Chiwuzie ¹ ; Daniel Ibrahim Dabara ² ; Olusegun Adebayo Ogunba ³ and Jonas Hahn ⁴	4
Rural land management and valuation in Zimbabwe: Challenges and Prospects	5
Ronald Mpofo ¹ ; Charles Chavunduka ² ; and Innocent Chirisa ³	5
The effect of space flexibility and building orientation on grade-B office building occupancy rate in Kampala City	5
Lynet Susan Namayanja; Moses Batanda Mubiru.....	5

The impact of corporate governance & corporate social responsibility on SA-REITs performance.....	6
Nosipho Moloi ¹ ; Omokolade Akinsomi ¹ ; Chuyuan Wong ²	6
Adoption of Community Land Trusts into Housing Policy for Provision of Affordable Housing Developments in Nigeria.....	7
Mina Elsie. L. Udom ¹ ; Anthony Dornubari Enwin ² ; Tamunoikuronibo Dawaye Ikiriko ³	7
Assessing Land Management Strategies and Social Implications of PLAS Beneficiaries in Mahikeng, South Africa.....	7
Joseph Awoamim Yacim ¹ ; Grace Boitshoko Merafe ² ; Benita G Zulch ³ ; and Partson Paradza ⁴	7
Evolution and the future of compensation for expropriation in Zimbabwe: A historical review.....	8
Partson Paradza ¹ ; Joseph Awoamim Yacim ² ; and Benita G. Zulch ³	8
Wetland gentrification in African cities: Implications for sustainable property development	9
Lewis Abedi Asante ¹ and Beverly Akomea Bonsu ²	9
An Evaluation of Compensation Valuation Practice in Nigeria	10
Austin Otegbulu ¹	10
Macroeconomic Policies and Housing Development in Lagos State, Nigeria	10
Titilayo A. Ukabam ¹	10
The tragedy of anticommons and associated challenges with management of Commercial Properties in Ghana.....	11
Abena Tweneboah Danso ^{1,2,*} and Emmanuel Kofi Gavu ^{2,3}	11
Decisions in the property valuation process	12
Carsten Lausberg ¹ ; Fabian Niebling ²	12
Affordable Housing Provision in Ghana: Experiences and the Way-forward	12
Benjamin Thomas Osafo ¹	12
The challenges and Opportunities for proptech adoption in Nigeria: an exploration of the factors that influence the adoption and diffusion of Proptech innovation in the Nigerian Real Estate industry.....	13
Olabisi Ojekunle	13
Analysis of the Dynamic Interrelationship Between Sustainable Investment and Real Estate Firm Performance.....	14
Frank Kwakutse Ametefe; David Kitulazzi; Precious Brenni; Francois Viruly.....	14
An Investigation into the use of artificial intelligence in property valuations in Zambia	15
Christopher Mulenga; Joseph Phiri.....	15
Investigating into the application of data analytics in Real Estate Investment Decisions among Lagos Valuers	15
Theresa Ukam.....	15
Risk and Uncertainty Analysis of Commercial Real Estate Developments: A Comparison of Traditional and Contemporary Approaches	16
Uduakobong E. Akpan ¹ ; Olusegun A. Ogunba ² ; Timothy T. Ayodele ²	16
A Study of Factors Affecting Apartment Prices in Gated Communities: The Case of Cairo, Egypt	17
Aly Karam ¹ ; Robert Simons ² ; Amad Almsaodi ³ ; Samuel Owusu Agyemang ²	17

The Spatial Dimensions of Real Estate Markets: Analysis of Spatial Effects on Rental Values in the CBD	17
Christopher Lyaruu; Samwel Alananga	17
An Evaluation of the Effectiveness of the Land Administration System in Kaduna State, Nigeria	18
Hope Gregory Yusuf	18
Customary Land Secretariats in Ghana as Champions of Efficient Customary Land Governance	18
Gad Asorwoe Akwensivie; Evans Agbenyegah; Adams Kamel	18
Women's Land Ownership and Rights in Botswana	19
Neltah Tshepiso Mosimanegape ¹ ; Kola Ijasan ¹	19
Real Estate Dispute Resolution in Kenya	20
Makathimo Mwenda Kiambi	20
Beyond Price Tags: Pioneering a Paradigm Shift in Affordable Land Allocation by Prioritising Non-Economic Criteria	20
Samson Agbato; Bioye Aluko; Tunde Oladokun; Ayodele Adegoke; Olalekan Aboderin	20
Cross-Sector Collaborations for Affordable Housing in Namibia	21
Anna Sophia Ressler; Jonas Hahn	21
Housing Affordability in Kenya: How Alternative Building Materials can be used to Lower the Cost of Housing in Kenya	21
Catherine Kariuki ¹ ; Nicky Nzioki ¹ ; James Waswa ¹	21
Understanding Housing Affordability Challenges in African Countries: Insights from Principal Component Analysis	22
Abukar Warsame	22
Ghana's National Rental Assistance Scheme: A scholarly critique and policy recommendations	23
Emmanuel Kofi Gavu ^{*1,2} ; Lewis Abedi Asante ³	23
Demystifying the Affordability of housing	23
Felician John Komu ¹	23
Perception of Indigenes on The Relationship Between Land Reforms Policies and Poverty Reduction/Wealth Creation in Ibadan, Nigeria	24
Babajide Femi Oguntokun ¹ ; Igbo Fayomi ² ; Abiola Benjamin Obayomi ³ ; Adewale Rufai Adedokun ⁴ ...	24
Analysing the effectiveness of the Delivery of Learning Materials to the Fourth Year Real Estate Class at University of Botswana	24
Johnson Kampamba; Simon Kachepa; Kefilwe Seketeme	24
An Assessment of factors influencing Insufficient Accommodation for Primary School Teachers in Gaborone	25
Johnson Kampamba; Simon Kachepa; Oarabile Wilcort Lechiile; Kefilwe Seketeme; Pheny Mpolokang	25
An Assessment of factors that affect Full Adoption of E-Learning by Built Environment Students in the University of Botswana	26
Zinzi Dikgang ¹ ; Johnson Kampamba ² ; Njideka Maryclara Aguome ³ ; Simon Kachepa ⁴ ; Fidelis Emoh ⁵ ; Pheny Mpolokang ⁶	26

An Assessment of factors influencing Insufficient Accommodation for Primary School Teachers in Gaborone	27
Johnson, Kampamba ¹ ; Oarabile Wilcort Lechiile ² ; Simon Kachepe ³ ; Pheny Mplokang ⁴	27
The Spatial Dimensions of Real Estate Markets: Analysis of Spatial Effects on Rental Values in the CBD Wards of Kisutu, Kivukoni and Mchafukoge in Dar es Salaam.....	28
Christopher Lyaruu ¹ and Samwel Alananga ²	28
Biodigester and Biogas Technology as Veritable Tool for Poultry Waste Management in the Federal Capital Territory, Abuja, Nigeria	28
Kehinde Abraham Ogunsanya ¹	28
The Assemblage of Power: How Kenyan and Chinese Interests Converge in the Real Estate Market.	29
Melike Toprak ¹	29
Application of Automated Valuation Model (AVM) in Land Rent Taxation: A Case Study of Nairobi City County	30
Marcel Byron Onditi ¹	30
PEER REVIEW PAPERS.....	32
Portfolio Diversification of Nigerian REIT: Evidence from an African Real Estate Market	33
Daniel Ibrahim Dabara ^{1*} ; Oluwafemi Timothy Ayodele ² ; Augustina Chiwuzie ³ ; Emmanuel Itodo Daniel ⁴	33
Professional Perspective on Contemporary Valuation Techniques in Tanzania: the case of Hedonic Pricing Method	54
Yusuph Abdi Iddi ¹ ; Upendo Matotola ²	54
Data Management Practices among South African Construction Professionals: Implications for Industry 4.0 Technologies in Construction Practices.....	67
Timothy Oluwafemi Ayodele ¹ ; Abel Olaleye ^{1,2} ; Ayodele Adegoke ¹ ; Chioma Okoro ²	67
Gender Diversity in Real Estate Education: Evidence from an African Higher Education Institution ...	110
Augustina Chiwuzie ¹ ; Daniel Ibrahim Dabara ² ; Olusegun Adebayo Ogunba ³ and Jonas Hahn ⁴	110
Rural land management and valuation in Zimbabwe: Challenges and Prospects	127
Ronald Mpofu ¹ ; Charles Chavunduka ² ; and Innocent Chirisa ³	127
The effect of space flexibility and building orientation on grade-B office building occupancy rate in Kampala City	146
Lynet Susan Namayanja; Moses Batanda Mubiru.....	146
The impact of corporate governance & corporate social responsibility on SA-REITs performance.....	165
Nosipho Moloi ¹ ; Omokolade Akinsomi ¹ ; Chuyuan Wong ²	165
Adoption of Community Land Trusts into Housing Policy for Provision of Affordable Housing Developments in Nigeria.....	183
Mina Elsie. L. Udom ¹ ; Anthony Dornubari Enwin ² ; Tamunoikuronibo Dawaye Ikiriko ³	183
Assessing Land Management Strategies and Social Implications of PLAS Beneficiaries in Mahikeng, South Africa.....	205
Joseph Awoamim Yacim ¹ ; Grace Boitshoko Merafe ² ; Benita G Zulch ³ ; and Partson Paradza ⁴	205

Evolution and the future of compensation for expropriation in Zimbabwe: A historical review.....	223
Partson Paradza ¹ ; Joseph Awoamim Yacim ² ; and Benita G. Zulch ³	223
Wetland gentrification in African cities: Implications for sustainable property development	239
Lewis Abedi Asante ¹ and Beverly Akomea Bonsu ²	239
An Evaluation of Compensation Valuation Practice in Nigeria	278
Austin Otegbulu ¹	278
Macroeconomic Policies and Housing Development in Lagos State, Nigeria	304
Titilayo A. Ukabam ¹	304
The tragedy of anticommons and associated challenges with management of Commercial Properties in Ghana.....	313
Abena Tweneboah Danso ^{1,2*} and Emmanuel Kofi Gavu ^{2,3}	313
 NON-PEER REVIEW PAPERS	 324
An Assessment of Challenges and Prospect of Real Estate Development in Nigeria	325
Onore Kehinde Onore ¹	325
Investigating the application of Data and Data Analytics in Real Estate Investment Decisions Among Lagos Valuers	336
Theresa Ukam Edet ¹	336
Biodigester and Biogas Technology as Veritable Tool for Poultry Waste Management in the Federal Capital Territory, Abuja, Nigeria	354
Kehinde Abraham Ogunsanya ¹	354
The Challenges and Opportunities for Proptech Adoption in Nigeria: an exploration of the factors that influence the adoption and diffusion of proptech innovation in the Nigerian Real Estate industry	385
Olabisi Sunday, Ojekunle ¹	385
The Spatial Dimensions of Real Estate Markets: Analysis of Spatial Effects on Rental Values in the CBD Wards of Kisutu, Kivukoni and Mchafukoge in Dar es Salaam.....	397
Christopher Lyaruu ¹ and Samwel Alananga ²	397
Housing Affordability in Kenya: How Alternative Building Materials can be used to lower the Cost of Housing in Kenya	420
James Waswa; Nicky Nzioki; Catherine Kariuki	420
The Green Mirror: Reflecting on Sustainability Reporting Practices of Indian and Australian Real Estate Stakeholders	432
Raghu Dharmapuri Tirumala.....	432
Macroeconomic Dynamics and the Causal Effect on Residential Real Estate Investment Returns in Abuja and Lagos, Nigeria	460
Faoziah Afolasade Gamu ¹ ; Halim Yusuf Agava ²	460
 ADVERTS	 481

Message from Conference Chair



I extend a very warm welcome to all of you to the conference on Pathways to sustainable real estate investment in the Sub Saharan African (SSA) Countries. I am especially honoured to welcome our invited distinguished speakers, most particularly the keynote speakers and chairs.

This conference has been organized in cooperation with the AfRES Executive Board, the Institution of Surveyors of Kenya and the Department of Real Estate, Construction Management and Quantity Surveying here at the University of Nairobi, Kenya.

In particular, I would like to thank the members of the Local Organizing Committee (LOC), Dr Felician Komu, Catherine Kariuki, Dr. Dennis Muthama, Professor Washington Olima, Dr. Raphael Kieti, Dr Mwenda Makathimo and the AfRES Executive Board led by the President, Professor Kola and the Executive Director,

Professor Aly Karam. Your advice, your networks, and your relentless support have been very much appreciated. Thank you very much to all of you for your fantastic help to get the conference process started off in a record time.

The African Real Estate Society (AfRES, www.afres.org), founded in 1997, is a continent-wide organization that seeks to promote networking, research and education among academics and professionals across Africa. It is affiliated to the International Real Estate Society (IRES), along with sister societies in North America (ARES), Asia (AsRES), Europe (ERES), Pacific Rim (PrRES) and Latin America (LaRES).

The 22nd African Real Estate Society Conference (AfRES) will be held on the 12th - 15th of September 2023 here in Nairobi Kenya. Since 2010 when the 10th AfRES Conference was held in Naivasha Kenya, there has been a strong momentum to hold the Annual Conferences of the African Real Estate Society across the continent. The 22nd Annual Conference is part of this great momentum. Some twenty universities are currently affiliated to AfRES and include members from 15 African Countries from the three chapters that form AfRES.

The Annual Conference will provide common platforms for sharing international experiences on best practices and appropriately dealing with the challenges in the real estate market.

The theme for the 22nd Conference is 'Pathways to sustainable real estate investment in the sub-Saharan African (SSA) countries' The theme takes cognizance of the evolving dialogues from the past 21 annual conferences. This dialogue has shifted from a focus on natural resources management (land, sustainability, and environment) in the early years (2001-2007) to real estate markets in the latter years (2009-2021). The 2022 theme pays attention to emerging issues in the 21st Century to sustainable real estate investment in the Sub Saharan African (SSA) countries. Indeed, the Conference sub-themes will include, but not be limited to discussions on Affordable Housing/ Social Housing, Sustainable Real Estate/ Smart Housing/ Green Building Initiatives

Sustainable Financing/ Mortgage, Real Estate Investment Trusts (REITs), and Land Digitization/ Digitalisation.

The conference organizers have made it as a priority that all the discussions and presentations will be guided and aligned to Africa's Goals & Priority Areas of Agenda 2063 relevant to sustainable real estate investment and the goal to stimulate debate on the future of real estate research and education in the region including a PhD Colloquia for African PhD Students around the Continent.

The Conference schedule will kick off on the Tuesday the 12th of September 2023 with two events taking place simultaneously i.e., a Masterclass in Real Estate Practice led by Professor Francois Viruly, the immediate past President of the IRES and Professor of Real Estate at the University of Cape Town in South Africa and a Golf Tournament at the UoN Vet Labs Sports Club at the Upper Kabete Campus of the University of Nairobi.

The main Conference sessions will run from the 13th of September to the 15th of September with a planned field visit in the afternoon on Saturday the 16th of September 2023 to selected housing development projects and construction sites within Nairobi City County.

Once again, a very warm welcome to each and every one of you to Nairobi, the Green City in the Sun!

Nicky Nzioki

22nd Annual AfRES 2023 Conference Chair

On behalf of the organising committee

Message from Scientific Committee Chair



This event brought together the brightest minds in government, industry, and academia to explore and discuss crucial issues surrounding sustainable real estate investment in the dynamic context of Sub-Saharan African countries.

I am delighted to announce that our conference was a resounding success, and this achievement is largely attributed to your invaluable contributions. We received an overwhelming response, with 23 peer review papers and an additional 39 non-peer review papers that offered diverse perspectives on the conference theme. Your enthusiasm for sharing your insights and research has enriched our discussions and significantly elevated the quality of our academic discourse.

Our theme, "Pathways to Sustainable Real Estate Investment in Sub Saharan African Countries" could not have been more timely and relevant. Your dedication to exploring sustainable practices within the realm of real estate investment will undoubtedly pave the way for positive change in the region and beyond.

I would also like to extend my heartfelt gratitude to both our industry experts and academics who took the time to present their papers. Your willingness to share your expertise and engage in meaningful discussions has been instrumental in shaping the intellectual atmosphere of the conference.

I would be remiss not to acknowledge the remarkable efforts of our numerous reviewers. Your commitment to rigorously evaluating and providing feedback on the submitted papers played a pivotal role in maintaining the academic integrity of our event. Your timely reviews are a testament to your professionalism and dedication, and we are sincerely thankful for your contributions.

As we move forward, let us carry the spirit of collaboration and commitment to sustainable real estate practices with us. The connections forged and the ideas exchanged during this conference will undoubtedly have a lasting impact on the field and the communities we serve.

Once again, I extend my deepest appreciation to all of you for making this conference a remarkable success. Your dedication to advancing the field of sustainable real estate investment is commendable, and I am honored to have had the privilege of working alongside such esteemed professionals and scholars.

Please stay connected with us through our various committees and social media networks, and I look forward to our continued collaboration in the pursuit of the objectives of AfRES.

Emmanuel Kofi Gavu, Dr.-Ing.
Scientific Committee Chair

Message from IRES President – Celebrating IRES/ AfRES Collaboration



Dear AfRES Members

It is a pleasure for me to be able to write a few words congratulating AfRES on reaching the milestone of its 22nd annual conference in Nairobi. I cannot think of a more poignant measure of the respect AfRES enjoys internationally, than the fact that you have recently provided IRES with two international Presidents – my predecessor, Francois Viruly, and Omokolade Akinsomi in 2025.

Since its inception in 1997, AfRES has made perhaps the biggest strides of any of our sister societies in growing its activities (30+ webinars so far this year) and expanding its geographic, cultural and gender inclusivity. In particular, we note your encouragement of women and young leaders, your data access initiatives, your work on cross-border valuation skills, your exciting 'francophone' language program, the quality of your research journal, and your overseas scholarship opportunities. As in all world regions, visible and diverse education and research initiatives are the key to enabling real estate to play its part in meeting the socio, economic and environmental challenges of our time.

While I cannot join you personally in Nairobi this year, several of our IRES Board members will be there. They include your President, Omokolade Akinsomi, your Past President Francois Viruly, Kunle Awolaja, Aly Karam and from ERES, Eamonn D'Arcy. I am delighted too that my good friend, Prof. Karl-Werner Schulte, has agreed to be one the presenters at our IRES Master Class on September 12th. As you know, Dr. Karl-Werner has been an inspirational leader in recent years, advancing academic real estate programmes across Africa. I hope you will take the opportunity to talk to these IRES representatives about AfRES/ IRES collaboration and perhaps become more involved.

Another measure of AfRES's success is the award of two of our three prestigious IRES awards this year to AfRES representatives. AfRES stalwart, Prof. Aly Karam, from the University of the Witwatersrand, has been awarded the IRES Service Award while the IRES Corporate Service Award has been awarded to the Ghana Lands Commission for their generous support. Congratulations to both!

IRES looks forward to participating in the conference as part of the Master Class being arranged by Past President, Francois Viruly, and as hosts of the IRES panel, debating the relevance of our academic research to industry practitioners. This is one of five parallel panels we are hosting at sister society conferences this year.

For me personally, Africa is quite special. Long ago (and I do not want to give away my age) I emigrated from the UK to Johannesburg. Unfortunately, the societal tensions of that era made career prospects uncertain for a young property professional. But to this day, I treasure warm memories of the people I met.

IRES aims to be a catalyst in supporting our societies as we work together sharing innovative ways of delivering real estate education and providing members access to an international network through which to expand their teaching, their research and their careers. I sincerely hope your 22nd Conference will be productive, successful and, above all, fun.

Steve Williams
2023 IRES President

Message from AfRES President



A warm welcome to our African Real Estate Society (AfRES) members. I am delighted to welcome you to Nairobi, Kenya. Well done to the local committee for all their efforts in organizing another AfRES meet in East Africa.

For the next five days, it opens with a golf day- an AfRES tradition, a new masterclass program that is the first of its kind with participating speakers worldwide impacting knowledge. The following three days include exciting presentations, panels, and thought-provoking and innovative research presentations on the conference theme “Pathways to sustainable real estate investment in the Sub-Saharan African countries.” Our theme for this year is particularly topical as we find solutions to Africa’s real estate and housing challenges while at the same time ensuring we do this through sustainable solutions spanning from land management to affordable housing to proptech to REITs to sustainable real estate and green buildings. This theme for the year is significant as we must ensure that our actions today in real estate investments and developments leave a better future for our children and the yet unborn.

As I depart as the AfRES president this year after serving as President for two years, I would like to thank the executive board of AfRES for their unwavering support. In 2 years, we have made great strides in flying the flag of AfRES high; we have signed three MOUs with the Royal Institution of Chartered Surveyors (RICS), the Academy of Construction and Real Estate (ACRE), and Estate Intel. I hope these partnerships will continue to fulfill the objectives of AfRES to educate, collaborate, and solve real estate problems through research on the African continent. A key aim of my assumption as president was that AfRES would become a more diverse organization. The future leaders of the African Real Estate Society (FLAfRES) and the women's committee have thrived in the last two years. I am happy to announce that they are represented on the executive board of AfRES as voting members. I would also like to commend all chapters and sub-committees for engaging with AfRES members; in the past year alone, a total of 33 virtual webinars have been hosted spanning academic, industry, and training workshops for AfRES members; this is a value add for our AfRES members. The introduction of the AfRES newsletter in 2022 is a welcome initiative that assists us in communicating with our AfRES members about news, events, or information related to AfRES or our sister societies worldwide; we have now published two volumes in 2 years. We also initiated the African Valuers Project in 2022 and set up a committee across Africa working towards a borderless Africa for Valuers on the continent. In 2022, we also set up the AfRES Achievement, Service, and Corporate Leadership Award, which was first presented in Accra, Ghana to the first recipients; I look forward to presenting these awards to honouring selfless AfRES leaders in Nairobi, Kenya.

As my role as President ends, I am grateful to steadfast AfRES sponsors over the years, specifically IREBS Foundation for African Real Estate Research and the University of Reading. I want to make a clarion call to all well-wishers of the African Real Estate Society: Our finances are in dire straits; I am therefore reaching out to you to dig your hands into your pocket to support AfRES by being a corporate sponsor, a fellow or a generous donor of this organization, a lot is outstanding which we can do together for good on this continent; however, we need your support to actualize this, and I am confident you would rise to this clarion call as AfRES members.

Finally, I wish you fruitful deliberations in the next few days. It was an honour for me to be of service to this great society. God bless Africa, God bless AfRES.

Prof. Dr. Omokolade Akinsomi

President, African Real Estate Society

Message from AfRES Executive Director



Dear Colleagues,

Welcome to our 22nd annual conference in the beautiful city of Nairobi, Kenya. We are very happy to be hosted by the East African Chapter of the African Real Estate Society chaired by Mr. Nicky Nzioki with his capable team. We look forward to each conference to learn from each other as colleagues and to also having fun together as the family that we are.

This year has been a hype of activities all around our continent. All the chapters were busy with different forums and of course our young leaders had the most. I did manage to attend some of the virtual events, but sadly some conflicted with work and I could not attend.

We have had some challenges with the website, but we are lucky the assistant to the executive director was more than capable of handling the situation and correcting the issues. Please let us know if there are different aspects that need work on our website so we can be up to your expectations. We try to update the site and include all the activities that we are doing so it is the go-to website for information.

I look forward to meeting you all at the conference and hope we have an enjoyable one this year and many more to come.

Regards.

Aly Karam
Executive Director

University of Nairobi Vice Chancellor's Welcome Remarks – 13th September 2023



It is my distinct privilege and honor to welcome you the University of Nairobi, and to those who are visiting Kenya for the very first time, Karibuni sana and I hope you get enjoy the conference as well as the hospitality of the Kenyan People. The 22nd AfRES Annual Conference themed "*Pathways to sustainable real estate investment in the Sub Saharan African (SSA) Countries.*" marks a significant milestone in the field of Real Estate, and it is with great enthusiasm that we extend our warmest welcome to the 200+ delegates from across Africa and the world participating in this prestigious event. This conference has been organized by the Faculty of Built Environment and Design.

Last Week, The Country hosted the Africa Climate Summit alongside the Africa Climate Week with a special focus on driving green growth and advancing climate finance solutions. As part of the Climate Summit, the University collaborated with Global Center on Adaptation (GCA) to host a high level inter-generational dialogue tagged, Africa driving Climate Adaptation solution & jobs. In addition, members of Faculty presented various scholarly papers during the summit. It was a powerful testament to our collective commitment to addressing the pressing climate challenges facing our continent.

Today, as we host the 22nd Annual AfRES Conference, Kenya, once again has the unique honor of being the focal point for knowledge exchange and collaboration among real estate practitioners and scholars from all corners of the globe. The 180 scholarly papers to be presented during this conference will address emerging issues in the Real Estates markets.

Allow me to express my deep appreciation for the longstanding partnership between the University of Nairobi and the African Real Estate Society (AfRES). Our very own Mrs. Catherine Kariuki, a distinguished member of the Faculty of Built Environment and Design, served as the President of AfRES in 2020 and 2021. Catherine is a renowned expert in the field of Real Estate in the region and has served society with unwavering dedication and commitment.

Ladies and Gentlemen, today we also have another significant milestone to celebrate as a university. The University of Nairobi and the International Finance Corporation will sign a Licensing agreement that will see the University implement The Green Building Market Transformation Program and Edge Application to empower our students with the knowledge and skills they need to be leaders in the field of sustainable construction. We will also create a pool of highly skilled professionals who can help Kenya transition to a more sustainable future.

In addition, this partnership will help us transform our campuses into beacons of sustainability. We will actively implement green building practices and vigorously pursue EDGE certification for our campus buildings. This will make our university a model for sustainable development, and it will inspire others to follow our lead. I am confident that this partnership will be a success. Together, we can create a more sustainable future for Kenya and the world.

As a leading research institution, we have long been at the forefront of efforts to generate and disseminate knowledge that informs policy in critical areas such as green building and sustainable construction. We recognize that the built environment plays a pivotal role in the fight against climate change, and we are committed to leading the way.

In conclusion, I would like to extend my warmest wishes to all the delegates gathered here today. May your engagements over the course of this conference be fruitful. Let us harness the collective wisdom in this room to drive positive change and innovation in the real estate industry. Together, we can shape a future that is sustainable, equitable, and prosperous for all.

Thank you and may this 22nd AfRES Annual Conference be a resounding success!

Prof. Stephen Kiama Gitahi, Phd (Vice Chancellor, University of Nairobi)

The Conference Event

AfRES is holding its 22nd Annual Conference from 12th to 15th September 2023 at the University of Nairobi in Kenya. The event is expected to host over 300 local and international attendees for an in-person conference.

Our conferences attract real estate stakeholders from all over the world, especially members of sister professional bodies, to discuss and present innovative solutions to real estate challenges especially with relevance to Africa. Professionals from real estate stakeholders, government agencies, academia as well as users of real estate services are encouraged to attend.

Conference format – In Person



Conference features

- Keynotes
- Panel discussions
- PhD Seminar
- Launches and Awards
- Parallel break-out sessions
- Social events – site tours

Organiser

The African Real Estate Society (AfRES) founded in 1997, is a continent-wide organization that seeks to promote networking, research and education among real estate professionals across Africa.

It is affiliated to the International Real Estate Society (IRES), along with sister societies in North America (American Real Estate Society – ARES), Asia (Asia Real Estate Society – AsRES), Europe (European Real Estate Society – ERES), the Pacific Region (Pacific Rim Real Estate Society – PRRES) and Latin America (Latin America Real Estate Society – LaRES).

The warmth and mutual support amongst members and between sister societies is characteristic, and anyone who wants to contribute is welcome.

AfRES Membership

Membership is currently organised on three (3) regions:

- Eastern Africa – Tanzania, Kenya, Uganda, Rwanda, Burundi, Republic of Congo, Seychelles, Eritrea, Djibouti, Comoros, Ethiopia, Sudan and Somalia
- Southern Africa – Republic of South Africa, Botswana, Swaziland, Lesotho, Mozambique, Madagascar, Zambia, Angola and Namibia
- Western Africa – Ghana, Nigeria, Mauritania, Senegal, Mali, Guinea, Burkina Faso, Cote D'Ivoire, Liberia, Sierra Leone, Togo, Benin, Cameroun, Chad, Central Africa Republic, Congo Brazzaville and Gabon

List of Reviewers

Emmanuel Kofi Gavu	Harvard University/ Kwame Nkrumah Univ. of Sci. &Tech.
Lewis Abedi Asante	Kumasi Technical University, Ghana
Omokolade Akinsomi	University of the Witwatersrand, South Africa
Joseph Kwaku Kidido	Kwame Nkrumah University of Science and Technology, Ghana
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Affordable Housing/ Social Housing
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Research priorities for real estate education/ curricula

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Conference Chair

Mr. Nicky Nzioki is a Senior Lecturer with over 40 years teaching experience in the Department of Real Estate, Construction Management and Quantity Surveying (RECMQS) in the Faculty of the Built Environment and Design (FBED) at the University of Nairobi. A holder of the postgraduate degree of the Master of Science in Building Maintenance Management from the University of Reading in England and a Bachelor of Arts Degree in Land Economics from the University of Nairobi. Mr. Nicky Nzioki is a Corporate Member of the Environmental Design Consultants' Chapter of the Architectural Association of Kenya (AAK)-EDC), Membership No 3208 and a corporate Member of the Institution of Surveyors of Kenya (ISK) in the key

chapter of Valuers and Property Management. He is an Environmental Impact Assessment and Environmental Auditing (EIA/A) Lead Expert and a Fellow of the Environment Institute of Kenya (EIK). He is a Registered and Practising Valuer under The Valuers' Act Cap 532 (VRB) Membership No 24 and a Registered and Practising Estate Agent by the Estate Agents Registration Board (EARB) Registration No 292 under The Estate Agents Act Cap 533 of the Laws of Kenya. He is a licenced and practising Building Surveyor under the Building Surveyors Act 2018 in Kenya. Mr. Nzioki is the Research Coordinator of the Cohort for Research on Environment, Urban Management and Human Settlement (CREUMHS), which is an accredited Civil Society Organization (CSO) by the UNEP, UNFCCC and the UNHABITAT. Over the last 7 years, Mr. Nicky has been serving as the Chairman of the Eastern African Chapter of the African Real Estate Society AfRES). Mr. Nicky Nzioki is the Chair of the 22nd Annual Conference of the African Real Estate Society (AfRES) that takes place from 12th – 15th of September 2023 in the Manu Chandaria Auditorium, University of Nairobi, UoN Towers at the University of Nairobi.



Scientific Committee Chair

Emmanuel Kofi Gavu (Dr.-Ing.) is currently the Pollman (postdoctoral) Fellow in Real Estate and Urban Development at the Harvard University Graduate School of Design for the 2022-2023 academic year. He is also Senior Lecturer at the Department of Land Economy, Kwame Nkrumah University of Science and Technology (KNUST) Kumasi, Ghana. He completed his PhD in Spatial Planning at the TU Dortmund University in Germany. He holds an MSc in GIS for Urban Planning and Management from the University of Twente in The Netherlands, as well as a BSc in Land Economy from KNUST Ghana. His main fields of teaching, research and professional interests are the application of geographical information system in urban management, real estate,

and housing market analysis. He has published in the areas of hedonic modeling, housing market dynamics and real estate education. Kofi is a Short-Term Consultant for the World Bank, board member of the African Real Estate Society (AfRES), Chair of the Future Leaders of the African Real Estate Society (FLAfRES), Scientific Committee Chair of AfRES, and professional member of the Ghana Institution of Surveyors (MGhIS).

Future Leaders of the African Real Estate Society (FLAfRES)

With a decline in new membership, an ageing membership, and a seeming lack of succession plan as challenges facing the African Real Estate Society (AfRES), the FLAfRES was inaugurated as a potential solution. The idea was that a youth-led committee within AfRES would appeal more to younger members in terms of volunteering their time for the organization. The target was early career academics, researchers, and professionals.

There was an urgent call to encourage younger colleagues to join the association to ensure sustainability and growth. This was achieved through the institutionalization of our primary mentorship program that pairs early career academics, researchers, and professionals to senior colleagues within the organization. The main object was to promote volunteering and mentoring the next crop of AfRES leaders and promote active participation among younger members. Volunteering activities include serving on seminar and conference organizing committees, seminar and conference supporting staff, editorial and logistics support during AfRES related programmes.

Another opportunity to train younger members is the feedback given to younger members who publish with the Journal of African Real Estate Society (JARER). JARER has a strong developmental dimension that mentors emerging African researchers. The journal offers quality feedback and support from the peer-review and publication process.

The first meeting of FLAfRES was held on 11th September 2019 in Arusha Tanzania. The meeting recorded 20 attendees. FLAfRES currently has an active WhatsApp membership of over 100 participants. This in our opinion is a complement to the AfRES organization in terms of new membership. We salute our founding directors Omokolade Akinsomi (currently the AfRES President), Emmanuel Kofi Gavu (currently the FLAfRES Chair) and Tayo Odunsi (immediate past FLAfRES Vice-Chair) for charting this path. It is our hope that this committee will grow in leaps in bounds to serve as a solid backbone to sustain AfRES for the next generation.

Emmanuel Kofi Gavu, Dr.-Ing.
(FLAfRES Chair, 2021 – 2023)



Local Organizing Committee



Nicky Nzioki
AfRES 2023 Chair
Senior Lecturer, University of Nairobi



Emmanuel Kofi Gavu, Dr.-Ing.
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ABSTRACTS

**Peer Reviewed*

Portfolio Diversification of Nigerian REIT: Evidence from an African Real Estate Market

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Abstract

This study examines REITs' risk-adjusted performance and diversification benefits in an emerging African property market (Nigeria). The data on the quarterly returns of N-REIT, the Nigerian Federal Government Bonds (FGB), and the stock market's All-Share Index (ASI) were obtained and analysed to reveal their risk-adjusted performance and diversification benefit. Two mean-variance portfolios were developed to assess N-REITs' effect in the mixed asset portfolio. While the first portfolio was unconstrained, the second was constrained to a maximum of 5%. According to the study findings, N-REIT demonstrated superior performance to the other assets. The examination of the unconstrained portfolio showed that increasing the allocation of N-REITs up to 28% had both return and risk reduction effects. An examination of the constrained portfolio showed that with an increased allocation to N-REITs from 0.00% to 0.05%, portfolio risk and return reduced from 2.78% to 2.59% and 12.49% to 10.93%, respectively. Comparing the two portfolios based on the return risk ratios, showed that including N-REIT beyond the 5% threshold might not yield optimal portfolio performance. This study can be a valuable resource for investors seeking to make well-informed investment decisions, particularly in emerging markets such as Africa.

Keywords: Asset allocation, diversification, investment decisions, N-REIT, risk-adjusted performance.

**Peer Reviewed*

Professional Perspective on Contemporary Valuation Techniques in Tanzania: the case of Hedonic Pricing Method

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Abstract

The property valuation industry has embraced various approaches to improve accuracy and provide clients with up-to-date property market information. One such approach is the Hedonic Pricing Method (HPM), which values properties by considering how the public values neighborhood features. Despite HPM's growing influence in global South countries like Nigeria and South Africa, it has received little attention from professional valuers and researchers in Tanzania. This study emphasizes the need for valuers to understand clients' perceptions of property attributes to analyze and interpret the property market effectively. The study evaluates the awareness and adoption of HPM among professional valuers in Tanzania. Data was collected from distributed questionnaires to registered valuers, and statistical analysis was conducted using SPSS software. The findings indicate that most practitioners in Tanzania are unaware of HPM and have not used it in practice. However, they express interest in acquiring knowledge and applying HPM to interpret property values. The study concludes that, when other requirements of understanding and adopting

contemporary valuation techniques are met, adoption of HPM will be achieved which will assist in bridging the gap between theory and practice to achieve sustainable property valuation practices.

Key words: HPM; Property Valuation; Sustainability; Neighborhood Attributes; Tanzania

**Peer Reviewed*

Data Management Practices among South African Construction Professionals: Implications for Industry 4.0 Technologies in Construction Practices

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Abstract

Purpose – This study examined the sources of construction data, the methods of data acquisition and storage, and the factors that influence data management practices among construction professionals in South Africa with a view to establishing their preparedness for Industry 4.0 technologies.

Design/Methodology/Approach - The study sampled the construction professionals registered with the South African Council for the Project and Construction Management Professions (SACPCMP). A closed-ended questionnaire was administered using an online survey tool. The data collected from a total of 134 responses were analysed using mean scores, standard deviations, one-sample t-test, and principal component analysis.

Findings – The results showed that the main sources of construction data are: firms' databases, networking with professional colleagues, and employees' personal records, with mean values of 4.19, 3.51, and 3.40 respectively. Also, findings revealed that data are stored mainly via electronic databases (*mean* = 4.33) and paper/manual records (*mean* = 3.94). The PCA result showed that project characteristics/industry/organizational idiosyncrasies and level of standardization/ICT tools/skills were the major factors influencing data management practices. While these two components have variances of 35.876% and 29.540% respectively, the two cumulatively explained 65.417% of the total variance. The study concluded that data management has become an important part of the construction professional's role

Originality/value – With the increasing integration of Industry 4.0 into construction practices, and the important roles of construction professionals in data sharing and assemblage, the paper highlights the need for conscious efforts toward ensuring good data management practices.

Keywords: Industry 4.0, data sources, construction professionals, automation, data assemblage

**Peer Reviewed*

An Evaluation of Shortfalls in Managing Public Urban Lands in Developing Countries: A study of Burundi

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Abstract

Public urban land management has been a challenge in developing countries despite efforts engaged by governments and development partners. Taking Burundi's case study, this paper identified shortfalls observed in public urban land management for developing countries. A qualitative research approach in data collection and analysis was applied. The desk review of different reports and policy documents was used and interviews with local leaders and influential people were conducted in the case study to collect participants' views and perceptions. Furthermore, a Key Informants Interview (KII) with high-rank authorities was prepared to confirm the interview and desk review findings. Then, data were analysed through the content analysis technique. The findings revealed that four shortfalls in public urban lands management include the legacies of colonialism in ownership of and access to land and politicisation of land management; the existence of a hidden hand in all land deals; laissez-faire in land management by top leaders to create a chaotic situation in land management; and lack of partnership between public and private partners in land management. The paper recommends that the Government of Burundi collaborate with stakeholders to afford the application of new approaches and technologies in public urban lands management.

Keywords: Burundi; Developing countries; Land; Land management; Public urban lands

**Peer Reviewed*

Gender Diversity in Real Estate Education: Evidence from an African Higher Education Institution

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Abstract

Workspace inclusivity remain critical in promoting diversity and dynamism across all sectors of the economy. Despite recent progress, gender disparities persist in the real estate sector, including education and training programmes. This study employs a quantitative research design to investigate gender diversity in real estate education at Federal Polytechnic Ede, Nigeria. The study focuses on female students' enrolment in real estate programmes from 2009 to 2022, their experiences, perceptions and career prospects. A self-administered questionnaire was used to collect data from 138 out of all the 150 female students currently enrolled in the programmes. The findings indicate that the gender

structure of real estate student enrolments is inclusive. Female enrolments have steadily increased and are stable below 50 per cent over the last thirteen years. However, female students face a lack of mentorship opportunities and perceive gender discrimination and bias in the real estate industry. These factors influence female students' self-esteem, motivation, and career opportunities in the real estate industry. This paper contends that the real estate sector must become more diverse. A proactive dedication to inclusivity, mentorship and the willingness to challenge existing norms and biases in the industry is needed to enable women to pursue real estate career.

Keywords: Career decision; equity and inclusivity; female student enrolments; real estate industry.

**Peer Reviewed*

Rural land management and valuation in Zimbabwe: Challenges and Prospects

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Abstract

Rural land value is variegated, spanning from spiritual to economic value. Despite a diverse value perception of land by differing people, the aspect of land management remains constant. Effective rural land management continues to be a necessary and innovative stimulant of land value in the face of increasing population and competing land uses. Using document analysis, this article seeks to unravel Zimbabwe's rural land management system and its impact on land value as an economic concept. It is the argument of this paper that the management of rural land is sporadic, asymmetrical, ineffective and inefficient to the detriment of its economic capabilities. Its valuation framework is unstructured and almost undefined. This article also shows that Zimbabwean rural land management and valuation policies have deprived the land of its potential. It further recommends a rural land management model consolidating scattered land laws and adopting international best practice recommendations.

Key words: Rural land; Land management; Land valuation

**Peer Reviewed*

The effect of space flexibility and building orientation on grade-B office building occupancy rate in Kampala City

Lynet Susan Namayanja; Moses Batanda Mubiru

Abstract

This paper focused on linking the influence of the specifics of building services orientation and space flexibility on the occupancy dynamics of Grade-B office buildings.

The paper employed a cross-sectional design, backed with qualitative and quantitative research approaches, on a sample size of 115 respondents including tenants (70), property managers/owners (40), and real estate experts (05).

Data collection was through questionnaires and interview guides. Quantitative analysis was done through univariate and bivariate methods buttressed by the use of MS Excel, MS. Word and STATA version 15. The qualitative component employed thematic analysis.

The findings indicate a significant relationship between occupancy length and the sufficiency of rentable space to meet business needs. Buildings with bigger rentable spaces had higher occupancy. Lastly, the majority (82.9%) of the tenants could not customize their rentable spaces according to their needs due to restrictions from landlords and property managers, leading to their high mobility. We recommend attention to the design and layout of parking spaces commensurate to the building's capacity and local regulations and ensuring flexibility of floor plans during building designs. A well-designed building with convenient road accessibility, ample parking, attractive amenities, and tenant-focused design can better retain tenants, leading to better building performance.

Keywords: office blocks; building orientation; design; occupancy rate

**Peer Reviewed*

The impact of corporate governance & corporate social responsibility on SA-REITs performance

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Abstract

This paper employs a CGI Index formulated from KING III and IV report to examine the link between corporate performance and quality of corporate governance (CG) and corporate social responsibility (CSR) of SA-REITs listed on the Johannesburg Stock Exchange (JSE). The CGI index is created from King III and IV. The empirical investigation using multiple correspondence analysis (MCA) reveals that corporate governance (CG) practices have a positive influence on firm performances measured by (such as total share return and return on assets). The results imply CG influences the firm performance of SA-REITs. The CSR index is created from the King reports, also the MCA was used, and CSR will likely improve SA-REITs performance by 13%.

Key words: Corporate governance, Corporate social responsibility, REITs, Performance

**Peer Reviewed*

Adoption of Community Land Trusts into Housing Policy for Provision of Affordable Housing Developments in Nigeria

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Abstract

Nigeria, like many other developing countries, faces significant challenges in providing affordable housing for its citizens, particularly in major cities experiencing population growth and urbanization. This study focuses on assessing the feasibility of implementing the Community Land Trust (CLT) model to address this pressing issue. Through a comprehensive review of literature and responses from thirty-one stakeholder interviewed, the study examines the success of CLTs in other countries, identifies opportunities and challenges associated with implementing CLTs in Nigeria, and explores potential partnerships among the government, private sector, and community organizations. Furthermore, the study evaluates the potential impact of integrating CLTs into Nigeria's housing policy, aiming to enhance the provision of affordable housing and improve the quality of life for low-income families. The study concludes that adopting the CLT model into Nigeria's housing policy holds promise as a sustainable solution for affordable housing provision and has significant implications for policy and practice in the affordable housing sector, not only in Nigeria but also in other developing countries confronting similar challenges.

Key words: Community Land Trusts, Housing Policy, Affordable Housing, Low-Income Families, Sustainable Housing

**Peer Reviewed*

Assessing Land Management Strategies and Social Implications of PLAS Beneficiaries in Mahikeng, South Africa

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Abstract

Governments of several countries adopted land reform as a tool to promote equitable land distribution. Whilst this is a welcome development, making the highest and best use of the land by beneficiaries is a matter of concern. Previous studies found nonchalance and improper utilisation of landed property assets among beneficiaries. Thus, this study aimed to analyse the social implications and land management strategies of the PLAS beneficiaries in Mahikeng, South Africa. Data were collected using semi-structured interviews and analysed thematically using Atlas-ti software

(version 22). Findings from the interviews confirmed that beneficiaries were acquiring farming skills, taking permissions from the Department before improving the farm's infrastructure, assessing the farm's reproductive value, piping the farm, maintaining the infrastructure, and making boreholes and dams. It was concluded that the social implications of PLAS in Mahikeng municipality included averting social unrest, promoting equity, alleviating hunger, contributing to the food chain and enterprise development, and facilitating practical training. Accordingly, the study recommends that the Department of Rural Development and Lands monitor and evaluate the land redistribution process to ensure that it meets its goals and objectives and identifies any challenges or areas for improvement.

Keywords: Land reform; Strategies to manage real property; Land redistribution; Social justice; South Africa

**Peer Reviewed*

Evolution and the future of compensation for expropriation in Zimbabwe: A historical review

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Abstract

Zimbabwe has a rich history of compulsory land acquisition, dating to the origins of colonial rule in 1890. This history is documented in policy documents, print and social media, and academic publications. However, to the researchers' knowledge for a complete history of the trajectory followed by the laws guiding expropriation and compensation from 1890 to 2022, multiple sources must be consulted. Currently, limited work (if any) does not provide a complete picture of the genesis/evolution of statutory compulsory land acquisition laws covering the entire period. Thus, the purpose of this study was to provide a complete history of compensation for expropriation in Zimbabwe while pointing out issues relative to equity and natural justice that occurred during the period under review. This paper was based on desktop research from 2018 to 2023. Documents which included statutes and government policies were obtained online from the official websites of government institutions. Systematic content analysis was adopted, and data coding was done manually based on themes derived from the data. The findings of this study supported the view that compensation for expropriation in Zimbabwe is complex and the international community can help to bring closure to the issue.

Keywords: Compensation, Evolution, Expropriation, Properties, Zimbabwe

**Peer Reviewed*

Wetland gentrification in African cities: Implications for sustainable property development

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Abstract

There is growing scholarly interest in notions of green gentrification in the global North, which explores how environmental improvement in gentrifying districts drives up real estate prices and subsequent displacement of low-income residents. Although similar processes of increasing demand for property development and its attendant displacement of urban wetlands is occurring in African cities, previous research have simply conceptualized it as wetland encroachment and not as a form of gentrification. The objective of this article is to re-conceptualize the dynamics of wetland encroachment in African cities within the broader conception of gentrification and analyze its implication for sustainable property development. Drawing on insights from extant literature on African urbanism, wetland encroachment and gentrification, we term the African variant of green gentrification as ‘wetland gentrification’. Wetland gentrification occurs when customary authorities, amid land scarcity and rising property values, alienate wetlands in urban neighbourhoods. Property development practices, typically by high-income earners and private developers, on urban wetlands lead to the displacement of the ecological resources and subsequently poor households and settlements through urban flooding. We frame wetland gentrification as tantamount to unsustainable property development because it deteriorates water quality and ecological lives, causes urban flooding, and deepens urban poverty.

Key words: Urban Wetlands; Wetland Gentrification; Green Gentrification; Sustainable Property Development; African Cities

**Peer Reviewed*

Affordable housing programmes in developing countries: The situation of low-income earners and owning houses in Burundi, Ethiopia, and South Africa

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Abstract

This paper aims to answer why affordable housing programmes implemented to assist low-income earners in selected countries (Burundi, Ethiopia, and South Africa) have not benefited low-income earners from owning housing in these programmes. The paper used a mixed research approach in data collection and analysis. The desk review, questionnaire, key informant interview (KII), and observation were used to collect primary and secondary data. Content and descriptive statistics were applied to analyse data. The findings show apart from South Africa where low-income earners can afford a house in affordable housing programmes, Burundi and Ethiopia programmes have served civil servants who are not low-income earners. Generally, Civil servants belong to medium- and high-income earners and can finance their housing using private financing. Public programmes for affordable housing have been benefiting

those who were not in urgent need of housing. This has left low-income earners to live in horrible and miserable houses. The paper recommends that developing countries should well-define and determine who is low-income and prioritize low-income earners in public affordable housing programmes.

Keywords: Affordable housing, Burundi; Developing countries; Housing; Low-income

**Peer Reviewed*

An Evaluation of Compensation Valuation Practice in Nigeria

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Abstract

The paper evaluates the practice of compensation valuation in Nigeria in the context of statutory provision and existing Nigerian Valuation standard with a view to determining if the valuation represents a fair and adequate compensation. The study reviewed existing rates in line with economic realities. Case study valuations were undertaken to demonstrate the adequacy or inadequacy of the existing practice.

Findings from the study indicate that the existing valuation practice represents an undervaluation of affected assets, which could lead to dissatisfaction by project affected persons. The practical implication of this is that it could lead to disturbance and delay in project implementation. The study recommends a review of existing statutes and correct application of valuation standard as contained in the statutes and the provisions of the new Nigerian Valuation standard with regard to compensation to enhance fairness in compensation valuation.

Keywords: Compensation; economic-value; rates standards; valuation.

**Peer Reviewed*

Macroeconomic Policies and Housing Development in Lagos State, Nigeria

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Abstract

Housing is crucial for national development as a capital product in terms of both economy and welfare. Macroeconomic policies comprise of fiscal policy, monetary policy, and exchange rate policy. These policies affect taxes, tariff, interest rate, inflation rate, employment rate and purchasing power. This study examined the effects of macroeconomic policies on housing development in Lagos State, Nigeria. The macroeconomic factors affecting housing development were incorporated into the questionnaire administered to real estate developers in Lagos State. The methods of analysis adopted were descriptive, correlation and multiple regression. The findings revealed that increase in interest rate, inflation rate, exchange rate and tariff will increase cost of housing development by 10.6%,

8.5%, 13.5% and 16% respectively. In conclusion, the current macroeconomic policies should be reviewed for favourable housing development, national capital formation of employment generation, income production and economic growth in Nigeria.

Keywords: Cost; Development; Housing; Macroeconomics; Policy

**Peer Reviewed*

The tragedy of anticommons and associated challenges with management of Commercial Properties in Ghana

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Abstract

The tragedy of anticommons is a property-owning structure where multiple owners hold the right to exclusion of a particular asset or resource; in effect when there exist too many decision makers (multiple co-owners/ landlords) in one property, it generally leads to underutilization and reduced revenues that might accrue in rent payments. For the asset to be optimally used, permission must be secured from all co-owners. Since, each owner has the right of exclusion; in effect any owner can veto the use of the asset. The problems inherent with anticommons presents itself in different ways which can create management challenges for a property manager. The different perception and appreciation of the multiple landlords about property management coupled with the intended economic profit they individually want to realize from their interest in the property can create conflicts in how they each believe the property should be managed to optimize profit. It can further compound the problems faced in the administration of professional management duties. This research uses a case study of a commercial property with multiple landlords (co-owners) in the Central Business District of Kumasi-Ghana. Analysis of data gathered by structured questionnaires for tenants and interviews with the property manager and landlords were used. The study revealed that problems faced by property managers included micromanagement by some of the landlords, poor or no scheduled maintenance practices and low level of professionalism by property manager. It is recommended that service and administrative charge should be discussed and agreed prior to the start of tenancy to eliminate misunderstanding between parties and promote payment to contribute to routine maintenance costs. It concludes that a property manager should be skillful in meeting specific investment objectives of co-owners to ensure that the property accrues optimal returns.

Keywords: Anticommons; Multiple Co-ownership; Commercial Property Management; Ghana

**Non-Peer Reviewed*

Decisions in the property valuation process

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Abstract

All decisions in a property valuation—such as the valuation method, the choice of data and the application of valuation parameters—are made by humans and are therefore subject to human decision-making characteristics such as cognitive biases. These have a significant impact on the accuracy and overall quality of property valuations, as numerous studies have shown. However, the results of this research have not yet found their way into valuation standards or textbooks. In particular, a process description with an explicit specification of the decisions to be made is lacking. This is problematic because a bad process can lead to bad results, i.e., inaccurate values. A good process, on the other hand, creates awareness of the decision situation, helps to analyse the situation and provides guidance on the best course of action.

The overall aim of this paper is to improve the quality of property valuations by identifying and classifying the key decisions in the valuation process and proposing an improved valuation process. To achieve this goal, the authors have analysed not only the current valuation literature, but also literature from Total Quality Management and other fields. Interviews were also conducted with valuers.

Key words: Valuation, property, process, decision-making, valuation accuracy

**Non-Peer Reviewed*

Affordable Housing Provision in Ghana: Experiences and the Way-forward

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Abstract

Housing has been considered as one of the basic needs of households. However, statistics indicate that households in Ghana are experiencing acute housing problems. The study sought to investigate the activities of four main stakeholders of households, mortgage institutions, estate developers and Government land sector agencies, in the housing industry to present sustainable recommendations to mitigate the problems. The principle of Demand and Supply, housing affordability theories and literature on housing in Ghana formed the basis of the literature review.

The case study methodology was adopted, and the New Juaben Municipality of Ghana was used as the study area. Data from face-to-face interviews, focus group discussions and documents (secondary data) were analyzed to identify the findings of the study. It was realized that the prices of houses were high, households' incomes were low, financial institutions experienced high interest and foreign exchange rate risks. Furthermore, there were unavailability and high cost of land and building materials whilst land title registration services were partially automated.

It was therefore recommended that houses should be supplied with varying prices, employers should subsidize prices of houses for households, foreign exchange and policy rates should be stabilized. Furthermore, developers should have

land banks and use locally produced quality building materials and the government fully automate the land registration services.

Key Words: Housing, Households, Mortgage, Estate Developers, Ghana.

**Non-Peer Reviewed*

The challenges and Opportunities for proptech adoption in Nigeria: an exploration of the factors that influence the adoption and diffusion of Proptech innovation in the Nigerian Real Estate industry

Olabisi Ojekunle

Abstract

This research paper examines the challenges and opportunities for proptech adoption in the Nigerian real estate industry. Proptech, a convergence of property and technology, has the potential to revolutionize the way real estate businesses are conducted by enabling more efficient, quick, and cost-effective operations. However, proptech adoption in developing countries like Nigeria faces unique challenges, including inadequate infrastructure, limited access to finance, and lack of awareness and trust in new technologies.

The study aims to explore the factors that influence the adoption and diffusion of proptech innovation in Nigeria. A descriptive survey will be used to gather data. A structured questionnaire will be distributed to real estate professionals, proptech companies, and potential users of proptech solutions in Nigeria.

The findings of this study will shed light on the current challenges facing proptech adoption in Nigeria and the opportunities it presents for the real estate industry. The results indicate that 70.6% of the respondents are currently using proptech solutions, with increased efficiency, cost reduction, and better decision-making identified as the main benefits. Lack of awareness was cited as the primary reason for not adopting proptech solutions. Factors influencing adoption include ease of use and compatibility with existing systems. Concerns regarding data privacy and security were noted as potential risks.

The study's significance lies in providing insights into the state of proptech adoption in Nigeria and identifying key challenges and opportunities. The recommendations of this paper will be valuable for real estate managers, developers, investors, brokers, and technology providers, helping them make informed decisions regarding the adoption of proptech solutions. By improving operational efficiency, enhancing customer experience, and driving business growth, proptech adoption can contribute to the growth and development of the Nigerian real estate industry.

**Non-Peer Reviewed*

The Future of Real Estate Market? Exploring the Potential of Big Data Analytics in South Africa

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Abstract

Big data is noted as being useful in various business markets, including the real estate market. By making use of data analytics to obtain actionable information significant from analyzing significant quantity of data, businesses may have an advantage over rivals in the market. This paper examines the current applications of big data analytics, its potential uses, as well as potential barriers to its use in the South African real estate market. A qualitative approach was adopted to administer semi-structured interviews to big data analytics specialists in the South African real estate market. Initial results show that Proptech market is still in its infancy in general and there is limited use of big data analytics in the South African real estate market in particular. However, there are benefits to using the technology, such as more efficient and effective customer service. Major challenges include the fact that the South African market is not ready to use it since there is no clarity or lack of knowledge that correlate the levels of investments needed and the accruing benefits. Challenges related to storage systems and costs and the scarcity of skills for technologies to support big data and big data analytics also prevail.

Keywords: Real estate market; Proptech market; big data analytics; South Africa

**Non-Peer Reviewed*

Analysis of the Dynamic Interrelationship Between Sustainable Investment and Real Estate Firm Performance

Frank Kwakutse Ametefe; David Kitulazzi; Precious Brenni; Francois Viruly

Abstract

Sustainability is increasingly gaining importance across the globe among investors, regulators, banks, governments, and various other stakeholders. The impact of different elements of sustainability such as corporate governance have also been studied extensively. Ametefe et al. (2023) identified two major strands of literature which consider the benefits of incorporating sustainable investment considerations in the investment decision of real estate firms. One strand looks at how sustainable investment practices impact the operating cost and profitability of real estate firms while a second strand looks at how ESG factors impact market fundamentals such as stock prices, return on asset, return on equity etc. Many of these studies however take a view that there is a uni-directional relationship between sustainable investment and real estate firm performance. The objective of this study is however to analyse the dynamic interrelationship between sustainable investment and the performance of real estate firms. The present study employs the ESG framework which evaluates a firm's sustainable investment practices using the three pillars of environmental,

social and governance sustainability. We make use of the Dumitrescu and Hurlin (2012) approach to testing Granger Causality which can be applied to a panel dataset. This test helps to determine if there is any, uni-directional or bi-directional relationship between real estate firm performance and the different elements of sustainability. The main focus of this paper is on listed real estate firms in South Africa, both REITs and non-REITs. The real estate market in market in developing countries have not been adequately represented in studies on this topic. For completeness however, we will include all firms listed on the JSE for which Bloomberg provides ESG data. Our analysis would be carried out on the overall ESG scores as well as specific ESG pillars i.e., Environmental, Social and Governance sustainability indicators. To determine how ESG scores vary between REITs and non-REITs, and also among the different industries and sectors, we will employ two tests, the Kruskal and Wallis (1952) test for K-independent samples and the Cuzick and Edwards (1990) test. These tests have been widely used to assess possible differences across independent samples (Wasiuzzaman et al., 2022).

**Non-Peer Reviewed*

An Investigation into the use of artificial intelligence in property valuations in Zambia

Christopher Mulenga; Joseph Phiri

Abstract

Real estate valuations, especially the case of mass valuation where statistical analysis methods are applied. New methods of determination of real estate value should be explored. Artificial omputerizat provides an alternative for the omputer applied method of multiple linear regressions. The omputerization of real estate values has been in existence since the 2000s with the consideration of various artificial intelligence techniques which include Artificial Neural Network, fuzzy logic, generic algorithm, and expert system. Since most properties comprise of both physical and economic characteristics which renders the conventional valuation methods cumbersome. In order to counter these challenges, soft computing techniques with higher data handling capabilities maybe an optimum choice.

Keywords: Artificial Intelligence; fuzzy logic; statistical techniques; multiple regressions

**Non-Peer Reviewed*

Investigating into the application of data analytics in Real Estate Investment Decisions among Lagos Valuers

Theresa Ukam

Abstract

The aim of this study is to investigate how Lagos state valuers leverage data to make investment decisions for their clients. The first objective of the research is to identify the appraisal process used by Valuers in their feasibility and viability assessments. A second objective is to identify the required data to facilitate and improve the valuation process.

A third objective is to determine the type of data collected by Valuers for the preparation of feasibility and viability reports, Fourth, to identify the significant challenges faced by Valuers in obtaining the required data and how they overcome these challenges in the hope of giving the client the best possible service. Finally, to conduct a content analysis of feasibility and viability reports to ensure compliance with data usage and application.

The cross-sectional study design will be used for the research. This design is suited for the study since it aims to determine prevalence of a phenomenon, situation, problem, attitude, or issue using a cross-section of the population in conjunction with the purposive sampling technique. The population and source of the structured questionnaire for this study are registered real estate professionals Estate Surveyors and Valuers in the Lagos metropolis. The data will be analyzed using tables of frequency and percentage occurrence of specific outcomes. The data for this study will come from a primary source. Previous findings have shown that data assists real estate professionals when it comes to investment decisions. It helps in analyzing and monitoring market trends, optimizing the buyer's selection process, understanding patterns to anticipate future growth, digitalizing, and automating real estate evaluations (predicting property prices). It also helps in boosting profits and reducing overall development costs. Considering the results obtained from past studies, this study is expected to find that data usage assists Nigerian real estate industries in regard to investment decision-making.

**Non-Peer Reviewed*

Risk and Uncertainty Analysis of Commercial Real Estate Developments: A Comparison of Traditional and Contemporary Approaches

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Abstract

The study assessed the degree to which the traditional NPV captured the risk and uncertainty inherent in real estate development projects in Lagos, Nigeria, using case studies. This was with a view to enhancing real estate investment decision making in developing countries of Africa. Two commercial real estate developments were selected as case studies for the study. Probabilistic risk analysis models (risk adjusted discount rate and certainty equivalent models) were used to assess the risk inherent in the development projects while real option analysis (Samuelson Mckean Model) was used to test the effect of flexibility on the investments (uncertainty analysis). The methodology involved first carrying out an appraisal of the case studies using the traditional NPV. Thereafter, the appraisal outcomes of the NPV analysis were compared to outcomes using contemporary models (risk and uncertainty analysis). The findings of the study showed that the contemporary models - which were not much in use in the study area - provided much more profound investment advice for clients and a much more robust basis for client decision making than the traditional NPV model. The study concluded that contemporary models deserve to be in much more use in the developing economies of Africa.

Keywords: risk analysis; real option analysis; NPV; development appraisal

**Non-Peer Reviewed*

A Study of Factors Affecting Apartment Prices in Gated Communities: The Case of Cairo, Egypt

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Abstract

The Greater Cairo Region (GCR) is considered by Statista (2021) as the twelfth urban agglomeration in the world with a population of 21 million. According to Aqarmap, there are around 800 gated communities in the GCR with around 20,000 listings currently for sale. A hedonic regression model is used to determine the factors affecting the listing prices of these apartments. Factors such as unit size, finish, views, floor height, community amenities, distance to highway interchanges, shopping centers, sales terms, developer reputation and proximity to poor residential areas are included. The model R^2 is .63. Controlling for location and sale date, results show that list price most affected by unit size, level of finish, and cash sales terms. We believe this is the first housing regression model focusing on Cairo.

**Non-Peer Reviewed*

The Spatial Dimensions of Real Estate Markets: Analysis of Spatial Effects on Rental Values in the CBD

Christopher Lyaruu; Samwel Alananga

Abstract

The location of commercial real estate properties within Central Business Districts (CBDs) has traditionally been considered a crucial factor in determining their Property Rental Values (PRV). Theoretical predictions in the field of real estate economics suggest that properties situated in prime spatial locations and close to amenities command higher PRV. It is however, still questionable on whether such higher PRV is a response to spatial dependence to amenities or purely a hedonic attributes effect of the property. This study examined three study wards of Kisutu, Kivukoni, and Mchafukoge within the CBD of Dar es Salaam city. Through a hedonic model analysis using questionnaire data from 180 tenants, the results suggests that tenants in these areas primarily consider PRVs based on their intuitive considerations to other buildings, rather than assessing the marginal effect brought about by spatial amenities such as ocean views, wind and open spaces. Proximity to services, particularly for business purposes, also drives tenant choices. These findings challenge the conventional understanding of spatial amenities as key determinants of PRV in the CBD, highlighting the unique dynamics of the case study areas. These findings can inform real estate developers, and policymakers in making informed decisions in property development, and investment strategies aimed at promoting sustainable and equitable development in urban areas.

**Non-Peer Reviewed*

An Evaluation of the Effectiveness of the Land Administration System in Kaduna State, Nigeria

Hope Gregory Yusuf

Abstract

A good land administration system is strategic to the development of a state. It should meet the needs of people and successfully manage land and its resources sustainably. This has however, not been the case with a lot of states in Nigeria. Kaduna State's land administration system has gone through reforms over the years. This paper evaluates the effectiveness of the land administration system in Kaduna state. The research is carried out with the use of questionnaires and complimented with personal interviews of land administration officials, industry professionals and landowners. Data is analyzed using frequency distribution and weighted mean score. In Kaduna State, all lands are registered by the Kaduna State Geographic Information Service (KADGIS). This study reveals that it can take less than six (6) months to obtain title documents. The biggest challenge of the land administration system remains a cloggy bureaucracy. It is recommended that enhancing best practice will require the enforcement of laws and policies of land administration to consolidate on the gains made in the ongoing reforms.

**Non-Peer Reviewed*

Customary Land Secretariats in Ghana as Champions of Efficient Customary Land Governance

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Abstract

Although Customary Land Secretariats (CLSs) in Ghana have been in existence for two decades, research on the institution has remained for a long time an uncharted territory except for periodic works by students. As a result, not much is known about the innovations some CLSs have employed to improve on land governance at the customary level in Ghana.

This work reviewed the entire working processes of 18 high performing Customary Land Secretariats selected from both Stool and family land areas in rural and urban Ghana to identify and explain how these Secretariats are operating within the ambit of the Land Act 2020, Act 1036 to improve efficiency of land management in terms of streamlining Customary Land Administration, maintaining reliable and up-to-date record of land transactions and settling disputes through Alternative Dispute Resolution mechanisms.

Results show that in areas where Customary Land Secretariats have been established, there is now credible data on land grants for use by investors. There is also a reduction in the number of disputes contrary to belief and that CLSs are making strides in public education and sensitization of the rural folks.

The work makes a number of recommendations that will enable developing economies to improve land management at the local level. E.g., The work buttresses the call for a system of monitoring of CLSs by CSOs based at the local level to check and expose abuse by traditional leaders in their role as trustees of the land.

Overall, the work points to the fact that, the Ghanaian example provides useful lessons for other African countries seeking to improve on participatory approaches to land management at the local level.

**Non-Peer Reviewed*

Women's Land Ownership and Rights in Botswana

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Abstract

Purpose: The National Assembly of the Republic of Botswana passed the 2015 Land Policy on July 16, and it was received by the country's population, notably women, with mixed feelings. The Policy's provision that "married women, widows and their children were not allowed to own land or be allocated land if their husbands were landowners" led to a general consensus that the Policy discriminated against women. Women's independence and economic rights were taken away, and this was largely criticized for fostering gender inequity.

In September 2020, Mokgweetsi Eric Masisi, the president of Botswana, changed the country's land policy to give all of its citizens, regardless of gender, an equal opportunity to own property with any tenure of their choosing. The government's commitment for gender equality in land ownership has been evidenced by the revocation of this discriminatory policy. The purpose of this essay is to demonstrate the significance of autonomous female land ownership as well as the current effects of policy.

Methodology: The study's design will be based mostly on a qualitative research methodology. But in order to compare and assess the number of plots allocated to men and women since the re-enactment of the tribal land allocation policy, statistical data will also be included in the methodology. The research paper will involve secondary data collection extracted from previously reported data through a systematic review of the Botswana Land Policy, which was first enacted in 1968, along with the allocation of tribal land administered by Main Land Boards in Botswana statuses. The Kweneng Land Board, particularly the Mogoditshane sub-land boards, will be the area of concentration.

Results: In 2020, a reported backlog of land allocation was close to 700 000 nationwide with the Mogoditshane sub-land board leading the waiting with applications of over 120 000 and a waiting period for tribal land by 27 years. The study will summarize the consequences of these backlogs and how it affects women's land allocation.

Conclusions: The theoretical findings of the research will state the extent to which women are affected by the new land policy, the allocation backlog, and whether it has been progressive in establishing women's equality in terms of land ownership.

Keywords: land policy/allocation; Botswana; women; gender; equality

**Non-Peer Reviewed*

Real Estate Dispute Resolution in Kenya

Makathimo Mwenda Kiambi

Abstract

There is always a probability of occurrence of disagreement in the processes of acquisition, registration, administration, development, use, management, and disposal of real estate. The possibility that the rights of parties could be infringed or perceived to be infringed may have varied causes at each of the stages. The results of such disputes could undermine the objectives of the owners, users, developers, managers and other stakeholders in the real estate industry. Disputes put at risk the requirements for peaceful enjoyment and security of property rights. They present threats to the value of investments in real estate and escalate the costs of development.

It is important that parties and stakeholders in the real estate industry understand the mechanisms and strategies for preventing and or resolving disputes to avert these adverse consequences. The appropriate choice and implementation of methods that are effective, efficient, just or equitable and affordable is necessary to maintain stability in the industry. The protection of relationships between the players is useful in building confidence in the markets.

Despite the general methods and approaches to dispute resolution being appreciated by professionals, the application and effectiveness in practice differs. Property being subject to National laws, regulations and policies presents diversity in suitability and permissibility for different mechanisms. The social cultural contexts present challenges that affect the acceptance and enforcement of results of the various dispute resolution mechanisms.

It is the objective of this paper to review the real estate dispute resolution mechanisms in Kenya.

**Non-Peer Reviewed*

Beyond Price Tags: Pioneering a Paradigm Shift in Affordable Land Allocation by Prioritising Non-Economic Criteria

Samson Agbato; Bioye Aluko; Tunde Oladokun; Ayodele Adegoke; Olalekan Aboderin

Abstract

This study is aimed at investigating the non-economic factors that affect land affordability, particularly in developing countries. To examine these factors, data was collected from 333 and 95 individuals who own residential plots at Redemption City and Ikosi Residential Scheme respectively. The findings of the study showed that different non-economic factors played a significant role in each of the two areas. In Redemption City, the important non-economic criteria included safety, comfort, quality management, proximity to markets, public transportation, and healthcare. On the other hand, the non-economic factors that were found to be significant in Ikosi Residential Scheme were proximity to public transportation, safety and comfort, a lack of environmental problems, and income levels. Overall, this study sheds light on the importance of considering non-economic factors when it comes to land affordability, particularly in developing countries. By doing so, private and public partnerships can be encouraged to work together to reduce the housing deficit in these areas. Additionally, the findings of the study can inform the formulation and revision of land policies that would benefit not only specific groups but all members of the community.

**Non-Peer Reviewed*

Cross-Sector Collaborations for Affordable Housing in Namibia

Anna Sophia Ressler; Jonas Hahn

Abstract

Namibia is in the midst of a housing crisis: A significant shortage of adequate and affordable housing is posing great challenges for the country and its population. The government has long recognized the severity of the situation, yet despite its efforts to address the housing needs of its citizens, supply has not been able to keep pace with the growing demand.

In light of this, cross-sector collaborations have been gaining prominence as viable alternative delivery mechanisms as opposed to the more traditional, government-led provision of housing. By leveraging the unique expertise, resources, and knowledge of each stakeholder group, such collaborative ventures aim to create more inclusive, sustainable, and people-centered housing solutions. Cross-sector collaborations, however, are complex endeavors and should not be regarded as an easy answer to challenging public issues.

Drawing upon a comprehensive review of existing collaboration literature, we propose a framework for understanding the dynamics and intricacies of cross-sector collaborations in Namibia's affordable housing sector, including drivers and initial conditions, processes and structures, as well as outcomes and constraints. Expert interviews are used to refine the proposed framework and to inform strategies for cross-sector collaborations aiming to increase the availability of adequate and affordable housing in Namibia.

**Non-Peer Reviewed*

Housing Affordability in Kenya: How Alternative Building Materials can be used to Lower the Cost of Housing in Kenya

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Abstract

During the 2nd UN Habitat Assembly held in June 2023, one area of focus was Universal Access to affordable housing. There are however many factors that have made it difficult for many households both in the urban and rural areas to access adequate and affordable housing. This paper argues that housing affordability can be addressed by incorporating alternative building materials technologies (AMBTs). The main objective of this paper is to document information on the available alternative technologies that are used in the provision of housing. Secondly to monitor and evaluate the performance of these alternative building materials and technologies. Thirdly attempt to document maintenance guidelines for the materials that are commonly used.

Findings: Affordability of housing for the low-income has been a concern that has been addressed in policy and by different political administrations for many years. It is now clear from research that though income and price of finished houses were the main factors identified as major challenges earlier, the cost of material has always been a

major cause of concern. Often what are called temporary materials like timber and soil blocks were not approved as permanent construction materials in Urban areas in Kenya.

The alternative building materials identified include the following, compressed stabilized earth blocks, interlocking bricks, rammed earth, straw bales – mainly from wheat traditional mud houses, fly ash bricks, rice husk ash, compressed Agricultural fiber –made from agricultural waste e.g., wheat and rice straw and recycled plastic products.

Practical Implications: The paper gives several recommendations on how governments can successfully deliver affordable housing. These include having stakeholders participate in the design and construction stage and use as much of the materials available on site. Appropriate building materials will reduce costs if the following is done: If most materials used are available on site. In some cases, costs are lowered if the owner builds most of the structure himself/herself (because most of these are labour intensive). Other ways to reduce the cost is mass production and the need to do monitoring and evaluation of the performance of AMBTs is done. Finally, maintenance manuals are prepared and given to owners and users.

Keywords: Affordable housing; alternative building materials; low cost, adequate housing

**Non-Peer Reviewed*

Understanding Housing Affordability Challenges in African Countries: Insights from Principal Component Analysis

Abukar Warsame

Abstract

Housing affordability remains a pressing challenge in numerous African countries due to rapid urbanization, population growth, and economic disparities. This study explores the multifaceted nature of affordability by considering variables such as GDP per capita, inflation rate, slum population percentage, female-headed households, unemployment rate, lending interest rate, maximum loan-to-value ratio, cheapest house price and size, and typical monthly rental. By combining and weighing these variables, a comprehensive affordability measurement is obtained. Utilizing Principal Component Analysis (PCA), the dataset's dimensionality is reduced, revealing key variables contributing to affordability.

Our preliminary results demonstrate that distinct components, encompassing socio-economic development, inequality, urbanization, labor markets, housing conditions, construction processes, and economic and business environment, influence affordability differently across countries. Understanding these factors enables policymakers to design targeted interventions such as income redistribution, slum improvement initiatives, gender-specific housing programs, employment generation measures, interest rate regulations, and housing finance accessibility policies. The findings from PCA, combined with examinations of the Gini coefficient, Human Development Index, and World Bank DBI quality index, facilitate evidence-based decision-making and the development of effective policies to enhance housing affordability and socio-economic conditions.

**Non-Peer Reviewed*

Ghana's National Rental Assistance Scheme: A scholarly critique and policy recommendations

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Abstract

Rental housing is growing very rapidly across many cities within Sub Saharan Africa and provides a nuanced approach to curbing the dynamics of housing supply as well as landlord-tenant relations. Due to the largely informal nature of housing provision in Ghana, enforcement of the Rent Act (Act 220) has been a major challenge, especially with respect to the rent advance phenomenon. There is documented evidence on the harrowing experiences of renters in connection with the rent advance system and the need for the state to intervene to ameliorate the financial burden on tenants. The government introduced the National Rental Assistance Scheme (NRAS) in 2023 to support tenants to pay the huge financial commitments required of the rent advance, while tenants in return pay back monthly. However, the operationalization of the policy has come to question. The objective of the paper is to examine the sustainability of the NRAS, by examining the source of funding, objectives, eligibility criteria and application process. The paper argues that if the policy focus of government is to promote monthly rent payments, why does government paradoxically promote a rent advance scheme of more than one year – this is a policy inconsistency. This paper is a scholarly critique designed to bring to the fore the scheme's shortcomings and provide relevant policy recommendations to strengthen the implementation. It builds on previous studies on rent advance in Ghana and other Africa countries.

Keywords: national rental assistance scheme; rental housing; advance rent; housing allowance; Ghana

**Non-Peer Reviewed*

Demystifying the Affordability of housing

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Abstract

This paper is a continuation of housing debates specifically on affordable housing. Based on a series of previous research work within Tanzania and in comparative housing studies across Africa, the quest for housing solution appears to assume more complexity foremost on the social construction of what housing represents. There are certainly challenges that nations are faced with in resolving housing problems despite the strong desire to resolve them. The paper inquires on these challenges in policy context, querying whether nations have failed to identify and measure the barriers against affordable housing strategies. The paper argues that land ownership is not a guarantee to affordable housing leave alone housing supply as Habitat (2021) submits. It surveys successful cases with a view of identifying potential innovative approaches in resolving the housing problem. It contends without a clear framework that supports

interplay of developers, planners, manufacturing and finance industries; a housing solution is not possible. The paper argues for detracting from a human settlement and welfare matter to a commodity that offers not only shelter but also possibility of income and not necessarily on a piece of land owned by the houseowner.

Keywords: Affordable housing; landownership; technologies

**Non-Peer Reviewed*

Perception of Indigenes on The Relationship Between Land Reforms Policies and Poverty Reduction/ Wealth Creation in Ibadan, Nigeria

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Abstract

This study examined perception of indigenes on the relationship between land reforms policies and poverty reduction/wealth creation in Ibadan, Nigeria. Land as we know, is a limited natural resource and therefore, very valuable. The imperative for land reform policies become necessitated for government to promote sustainable economic growth and development, perform the function of maintaining order in land acquisition processes, and ensuring equitable distribution of land and its resources, thereby creating equal opportunities for wealth creation and poverty reduction. To undertake this study, 424 respondents, comprising of landowners, estate Surveyors and valuers, were purposively sampled using a well-detailed questionnaire to elicit information. Both descriptive and inferential statistical tools were adopted in analyzing the information obtained. The study found that the understanding and practice of land reform policies was higher among the respondents (56.1%) than respondents with little or no knowledge about land reform policies. The study concluded that knowledge is high among people, but performance was low.

Keywords: Land; Property; Valuer; Development; Estate

**Non-Peer Reviewed*

Analysing the effectiveness of the Delivery of Learning Materials to the Fourth Year Real Estate Class at University of Botswana

Johnson Kampamba; Simon Kachepa; Kefilwe Seketeme

Abstract

There is low retention of learning materials by fourth year real estate students. The aim of this study was to assess the effectiveness of delivery of learning materials by establishing if what students learnt through listening, reading, organization and demonstration could be remembered in a class exercise. Learning materials were presented to the

class of 24 students, in the form of presentation, for the past two weeks for a twelve – hours session using different pedagogical methods to assess their listening, reading, visualization and demonstration skills. Based on the literature reviewed, it was revealed that the level of absorption by learners through listening, reading, ognization and demonstration was around 40%, 30%, 60-80% and 30% respectively. The Visual, Auditory, Kinesthic (VAK) model was used to assess the learning achieved by the learners. An exercise was administered to 24 students to test and validate the theories. It was discovered that on the question that was prepared based on the listening theory, less than 42% of students were able to retain what they had listened to and read. On the ognization theory, Seventy-five percent (75%) were able to remember what they had seen with their own eyes and the images presented to them. Finally, Ninety-two percent (92%) were able to remember what was demonstrated in class. When using pedagogical strategies, It is recommended that lecturers should be ognizant of the blended learning by varying the teaching styles so that to enable learners to have a higher chance of remembering what they were taught in class thus to improving academic performance.

**Non-Peer Reviewed*

An Assessment of factors influencing Insufficient Accommodation for Primary School Teachers in Gaborone

Johnson Kampamba; Simon Kachepa; Oarabile Wilcort Lechiile; Kefilwe Seketeme; Phenyio Mpolokang

Abstract

The core problem of this study is that there is insufficient accommodation for primary school teachers in Gaborone. Once this Maslow's hierarchy of needs is not fulfilled, the affected is insecure. Short of accommodation can affect the performance of learners as the productivity of teachers is at its lowest ebb. The purpose of this study was to assess the factors influencing insufficient accommodation for primary school teachers in Gaborone, Botswana. In order to achieve these objectives, both primary and secondary sources of data were used. The primary sources of data includes 1,603 primary school teachers of various levels in the teaching profession in Gaborone. The primary data was collected by randomly distribution of questionnaires to 141 teachers at 90% confidence level. Secondary data was collected from journal articles, books, and reports. The findings of the study reveal that variables that affect insufficient accommodation to primary school teachers in Gaborone include high cost of rent, poor infrastructure provided by government, lack of Public Private Partnerships (PPPs) in housing provision, poor planning and maintenance of existing buildings, over reliance on government to provide housing as well as lack of adequate housing units on site. The factors that highly had an impact on insufficient accommodation provision are human factors, followed by financial factors, institutional factors, and physical factors.

**Non-Peer Reviewed*

An Assessment of factors that affect Full Adoption of E-Learning by Built Environment Students in the University of Botswana

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Abstract

Purpose: In recent years, technology has revolutionized the field of education, offering new opportunities for learning and knowledge acquisition. One such advancement is e-learning, which refers to the use of electronic technologies to deliver educational content and facilitate remote learning experiences. Despite the potential benefits it offers, such as enhanced engagement, interactive learning experiences, and access to a wealth of resources, there seems to be a gap in the adoption and utilization of e-learning tools and platforms by Built Environment students in the University of Botswana. Therefore, the purpose of this study is to assess the factors that affect full adoption of e-learning by built environment students in the University of Botswana. The core research problem is that e-learning has not been fully adopted by built environment students in the University.

Methodology: Data for this study was collected using both primary and secondary sources. Primary source of data for this study was randomly obtained from 150 built environment students from the University of Botswana, Gaborone which was collected using a questionnaire. Secondary sources of data was collected from books, reports and journal articles using the University of Botswana online databases. From the total population of 361 built environment students, a sample size of 150 was determined using a 90% confidence interval with standard error of 10%. This sample size was deemed sufficient to draw meaningful conclusions using probability sampling techniques. The statistical tool employed to analyze the factors that affect the full adoption of e-learning amongst built environment students at the University of Botswana was multiple regression analysis. This technique allowed for the examination of the relationships between various factors and the adoption of e-learning. Statistical Package for Social Science (SPSS) and Microsoft Excel software packages were used to analyze the data which facilitated the organization, manipulation, and interpretation of the results. Various charts were also generated to visually represent the results, enhancing the clarity and comprehension of the findings.

Findings: The study revealed that the factors that cause the lack of full e-learning adoption by built environment students were technological factors (poor internet connectivity), pedagogical factor (different learning styles) and the institutional factor (inadequate student training). The factors that highly had an impact on students' adoption of e-learning were the pedagogical and technological factors. Relevant solutions proposed to address the causes of lack of full adoption of e-learning included incorporating and using different learning styles and having regular e-learning training sessions for students so as to foster the full adoption of e-learning by built environment students in the University of Botswana.

Value of the study: This study is important in that it delivers knowledge on the areas that have not yet been addressed in the existing study of e-learning. This has been achieved through conducting an intensive research on the factors that affect the full adoption of e-learning in the University of Botswana, built environment students. Furthermore, it provides recommendations on how the factors that affect e-learning in the students can be mitigated in order to pave way for full e-learning adoption by the built environment students in the University of Botswana. Henceforth, the study is significant in that it provide the relevant authorities with the necessary information which will assist in decision making and necessary reforms.

Keywords: E-learning; built environment students; University of Botswana; pedagogical factors; technological factors; institutional factors

**Non-Peer Reviewed*

An Assessment of factors influencing Insufficient Accommodation for Primary School Teachers in Gaborone

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Abstract

Purpose: The core problem of this study is that there is insufficient accommodation for primary school teachers in Gaborone. The purpose of this study is therefore to assess the factors influencing insufficient accommodation of primary school teachers in Gaborone, Botswana.

Methodology: The objectives of this study were: to identify factors influencing insufficient accommodation for primary school teachers in Gaborone; to analyse how the identified factors, impact insufficient accommodation for primary school teachers in Gaborone; to determine why primary school teachers are not utilizing government initiatives such as Self Help Housing Agency and Government Employees Motor Vehicle and Residential Property Advance Scheme (GEMVAS) for housing provision and to come up with solutions that can be used by the government to provide adequate housing to civil servants in Gaborone. In order to achieve these objectives, both primary and secondary sources of data were used. The primary sources of data include 1,603 primary school teachers of various levels in the teaching profession in Gaborone. The primary data was collected by distribution of questionnaires to 141 randomly selected teachers while secondary data was collected from journal articles, books, and reports. Quantitative research method approach was utilized where the attained quantitative data was analyzed statistically by use of the Statistical Package for the Social Sciences (SPSS) software and Microsoft Excel to ease interpretation and understanding of the study. The demographic data of respondents was presented using frequency distribution, and the rest of the data collected was analysed using SPSS.

Findings: The findings of the study reveal that variables that affect insufficient accommodation to primary school teachers in Gaborone include high cost of rent, poor infrastructure provided by government, lack of Public Private Partnerships (PPPs) in housing provision, poor planning and maintenance of existing buildings, over reliance on government to provide housing as well as lack of adequate housing units on site. The factors that highly had an impact on insufficient accommodation provision are human factors, followed by financial factors, institutional factors, and physical factors. A model was developed that would enhance provision of sufficient housing to primary school teachers was developed in the study.

Significance of the study: This study makes a significant impact in filling the gaps in the existing knowledge of teachers' accommodation. This has been done through conducting intensive research of factors influencing insufficient accommodation for primary school teachers. Furthermore, the study has provided recommendations as to how the stated factors could be mitigated so as to establish adequate accommodation to primary school teachers. The local government will gain strategic insights on how to best provide accommodation to primary school teachers despite the various factors affecting their involvement in housing provision to key workers.

Research implications: The implications of this study are that it may encourage the government departments such as the Department of Housing and Department of Town and Country Planning to formally recognize the need for teacher's housing. Formally recognizing this sector will result in enhanced participation of private developers also hence having the ability to generate monetary funds. This study improves the existing body of knowledge primarily regarding teachers' housing. It paves way for further research to be undertaken on teacher's housing as an investment, the potential risks and benefits of this type of investment asset with particular emphasis to Botswana.

Keywords: keyworkers; housing affordability; insufficient accommodation; primary school teachers; housing provision

**Non-Peer Reviewed*

The Spatial Dimensions of Real Estate Markets: Analysis of Spatial Effects on Rental Values in the CBD Wards of Kisutu, Kivukoni and Mchafukoge in Dar es Salaam

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Abstract

The location of commercial real estate in Central Business Districts (CBDs) is crucial for determining their Property Rental Values (PRV). Real estate economics predicts that properties close to amenities in prime spatial locations command higher PRV. This study focused on three wards in the CBD of Dar es Salaam, Tanzania: Kisutu, Kivukoni, and Mchafukoge. Using a Hedonic model, the research analyzed data by regressing PRV per square meter on property and neighborhood characteristics, while spatial dependence was represented through a dummy variable reflecting enjoyment from spatial amenities offered by the ocean (e.g., proximity to walkable areas/beach, ocean scenic view, quality air/breeze) and proximity to open spaces like a golf playground. The regression results indicated that proximity to walkable areas/beaches and perceived air/breeze quality positively and significantly influenced PRV, leading to USD 1.798 and USD 1.043 higher rent per square meter respectively, for areas enjoying the amenities than those otherwise. However, the presence of an ocean scenic view and proximity to open spaces did not significantly affect PRV. These findings highlight the importance of spatial amenities in contributing to PRV in CBD properties, informing real estate developers, investors, and policymakers in making informed decisions on property development, investment strategies, and promoting sustainable and equitable urban development.

Keywords: commercial real estate; property rental values; central business districts; spatial amenities

**Non-Peer Reviewed*

Biodigester and Biogas Technology as Veritable Tool for Poultry Waste Management in the Federal Capital Territory, Abuja, Nigeria

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Abstract

Poultry waste management is multidimensional and involves public health, waste management, utilization of fertilizing value, and fuel and energy production issues. The poultry industry in FCT Abuja, Nigeria, faces significant challenges in managing the large quantities of organic waste generated, which can have detrimental effects on the environment and public health if not properly handled. This thesis explores the potential of biodigester and biogas production as a sustainable and efficient technology for poultry waste management in FCT Abuja, Nigeria. The study aims to assess the feasibility, economic viability, benefits, and limitations of biodigester and biogas technology in

managing poultry waste, providing valuable insights for policymakers, poultry farmers, and environmental stakeholders.

The intent of the study is also to show that the chicken waste used as feed material to produce biogas can tap additional energy from the otherwise wasted energy and make the poultry industry co-exist with the environment of the neighbours. This research will identify and evaluate the economic feasibility of producing biogas from poultry waste. The research is of particular interest to the poultry farmers and to Waru community of Federal Capital Territory, Abuja, Nigeria, as the people are becoming very conscious of the environmental impact due to pollution. This will also solve the crisis of offensive smell emanating from the poultry farm, causing disputes between the poultry farmer and the host Waru Community.

Keywords: Bio-digestion; Biomass; Biogas; Poultry Waste; Renewable Energy; Slurry

**PhD Session*

The Assemblage of Power: How Kenyan and Chinese Interests Converge in the Real Estate Market

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Abstract

This paper investigates how Kenyan agency played explicit and implicit role in shaping Chinese real estate investments in Nairobi. The study explores the key components of the real estate assemblage, the interactions between local agencies and Chinese companies, and the factors contributing to their convergence in housing projects.

The main argument of this research is that examining the real estate assemblage will significantly advance our understanding of the dynamics between Kenyan and Chinese actors in the real estate sector by shedding light on their interactions and the complexities of the urban landscape.

It addresses a notable gap in the literature on political geography by focusing on urban spaces in the context of Chinese investments in African countries rather than exclusively concentrating on resource-rich nations.

The methodology employed in this research entails a detailed case study of Nairobi, with a specific focus on residential areas where Chinese actors are concentrated such as Kilimani, Kileleshwa, Lavington and Kitisuru

Keywords: China-Afrika Relations; Assemblage Thinking; Housing Market; Kenya

**PhD Session*

Application of Automated Valuation Model (AVM) in Land Rent Taxation: A Case Study of Nairobi City County

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Abstract

Property taxes, notably land rent, are crucial revenue sources particularly in third-world countries. Land rent is determined by factors like location and market forces and is governed in Kenya by the Land Act No. 6 of 2012. Manual valuation methods have led to inconsistencies, inefficiencies, and corruption. Many countries have adopted the Automated Valuation System (AVS), which lowers costs, enhances efficiency, ensures transparency, and boosts revenue collection. However, the adoption of AVS in developing nations remains largely uncharted in literature. The study seeks to fill this gap by scrutinizing various Automated Valuation Models (AVMs) for land rent taxation in Nairobi City County using data from the years 2020 to 2023. These datasets include existing land rents, property values, zoning ordinances, and public facilities' locations. The research will use a case study of Nairobi City County, utilizing a cross-sectional quantitative research design and stratified random sampling considering the 20 zones in Nairobi as strata. The study will employ tools like ArcGIS Pro and R Statistic, the research will utilize techniques from multiple regression to Artificial Neural Networks to create prediction models for land rent. After assessing each model's accuracy, the most effective will be recommended for Kenya's use.

Keywords: Land Rent Taxation; Automated Valuation Models; Prediction Models

PEER REVIEW PAPERS

**Peer Reviewed*

Portfolio Diversification of Nigerian REIT: Evidence from an African Real Estate Market

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Abstract

This study examines REITs' risk-adjusted performance and diversification benefits in an emerging African property market (Nigeria). The data on the quarterly returns of N-REIT, the Nigerian Federal Government Bonds (FGB), and the stock market's All-Share Index (ASI) were obtained and analysed to reveal their risk-adjusted performance and diversification benefit. Two mean-variance portfolios were developed to assess N-REITs' effect in the mixed asset portfolio. While the first portfolio was unconstrained, the second was constrained to a maximum of 5%. According to the study findings, N-REIT demonstrated superior performance to the other assets. The examination of the unconstrained portfolio showed that increasing the allocation of N-REITs up to 28% had both return and risk reduction effects. An examination of the constrained portfolio showed that with an increased allocation to N-REITs from 0.00% to 0.05%, portfolio risk and return reduced from 2.78% to 2.59% and 12.49% to 10.93%, respectively. Comparing the two portfolios based on the return risk ratios, showed that including N-REIT beyond the 5% threshold might not yield optimal portfolio performance. This study can be a valuable resource for investors seeking to make well-informed investment decisions, particularly in emerging markets such as Africa.

Keywords: Asset allocation, diversification, investment decisions, N-REIT, risk-adjusted performance.

Introduction

Typical to every rational investor, is the drive to earn profits by ensuring the optimal combination of assets within mixed-asset portfolios. However, investors have been increasingly concerned about understanding the performance and optimal combination of investment assets, especially real estate assets. Bredin (2007) noted that a significant concern to investors is the investment performance of the array of investment alternatives. Hence, investors need to understand the risk-return performance and the diversification benefits of investment assets to make informed investment decisions. Understanding the risk-returns characteristics and the optimal asset combination strategies will enhance the predictability of asset and portfolio performance, thereby ensuring optimal investment decisions (Li, Fong & Chong, 2017; Lin, Cho & Lee, 2019). The

concept of asset combination is intuitively evident in most investment decisions. Asset combination is geared towards reducing portfolio volatility while enhancing returns. Real estate has established its position as a strategic asset class within a diversified portfolio. This is due to its effectiveness in diversifying risks within a mixed-asset portfolio, along with other notable advantages (Higgins & Ng, 2009; Ayodele & Olaleye, 2016). Empirical evidence suggests that the diversification benefits of real estate assets enhance the overall performance of mixed-asset portfolios. This was clearly portrayed in an earlier study conducted in South Africa by Ntuli & Akinsomi (2017) where REITs were shown as return-enhancers in a mixed asset portfolio.

Extant studies have submitted that real estate asset forms a significant part of investors' portfolio. Hoesli (2002) noted that the performance of real estate assets, either as an independent asset or in a portfolio mix, will be of concern to investors. This concern becomes more compelling in emerging economies as emerging markets are bedeviled with a high rate of fluctuations and volatilities as opposed to the developed markets with somewhat stable and predictable macroeconomic indices (Ayodele & Olaleye, 2021). Thus, understanding the investment performance and diversification benefit of indirect real estate assets becomes germane to all categories of real estate investors.

Investors' decisions must involve a complete understanding of the investment markets and prevalent scenarios, risk-return performance and diversification benefits of investment assets; especially when considering asset combinations. This will help to determine the commonality between assets within the portfolio, which according to Olaleye & Ekemode (2014), is an essential consideration for investors before venturing into a mixed-asset combination. Thus, understanding real estate assets' investment performance and diversification benefits would enhance optimal investment decisions. This information would be beneficial to both domestic and international investors who are interested in incorporating investment assets such as REIT into their investment portfolios.

Information on the behaviour of REIT investment in a mixed asset portfolio is essential to investors. Such information can guide shrewd investors who wish to grow their investment portfolios. There are several empirical studies conducted on REIT as a singular investment vehicle and in combination with other investment assets across the global real estate markets. The available research in this field covers REIT returns, REIT risk-adjusted performance and its inflation-hedging capabilities, among others, especially in markets of developed countries (Daniel, 2022). Some of the studies conducted on REIT include a study undertaken by Newell & Osmadi (2009) on the Islamic REIT in Malaysia. In Europe, Marzuki & Newell (2019) examined the performance of REIT in the Belgium market. The authors of the study also examined the growth and performance of REITs in Ireland (Marzuki & Newell, 2019). Similar studies were also conducted in Australia (Liang & Dong, 2019) and the US (Koelbl, 2020), among others. It has, however, been observed that there is a dearth of literature in this field concerning emerging markets, particularly Africa. The scanty literature of African origin majorly focused on the issue of REIT return

performance and investment uncertainties (Ntuli and Akinsomi, 2017; Akinsomi et al., 2018; Daniel, 2022). To the best of the authors' knowledge, apart from the study conducted in South Africa by Ntuli and Akinsomi (2017), no other previous African studies have explored the diversification benefits of African REITs within a mixed-asset portfolio. Furthermore, a substantial amount of literature on the subject of diversification was observed to be primarily focused on direct real estate (Ojo et al., 2022).

Ogunba et al. (2021) and Daniel (2022) argue that findings from these studies cannot be easily generalized due to several factors, such as diversity in asset types, geographical locations, and the maturity level of the market where the asset is located. Loo et al. (2016, p. 231) also highlight additional reasons, including “variations in asset management structure, geographic limitations on underlying assets, real estate development allowances, restrictions on leveraging, and dividend pay-out requirements”. These factors contribute to the complexity and uniqueness of each market, making it challenging to draw broad conclusions. Furthermore, the behaviour of securitised real estate, such as REIT and direct real estate investments, differ considerably, hence the need to look at their performances and diversification benefits separately.

In a global investment landscape characterized by the pursuit of optimal asset combinations and risk management, the integration of real estate investment trusts (REITs) within mixed-asset portfolios remains a pertinent topic of investigation. While existing research has illuminated the performance and diversification attributes of REITs across various markets, there remains a conspicuous gap in the exploration of this phenomenon within the context of emerging African economies. Notably, the limited body of work hailing from the African continent primarily spotlights South Africa, leaving the unique characteristics of other African markets, particularly Nigeria, unexamined. The absence of comprehensive research delving into the diversification dynamics of Nigerian REITs underscores the urgency of this inquiry.

Distinct economic, regulatory, and market forces set Nigeria apart from South Africa, thereby warranting an in-depth investigation into this underexplored territory. The Nigerian real estate landscape is characterized by its own intricacies, encompassing a range of factors including market maturity, regulatory frameworks, political dynamics, and macroeconomic stability. These unique elements interact to shape the investment behaviour and risk-return profiles of Nigerian REITs in ways that may deviate from the trends observed in South Africa.

Through a meticulous analysis of Nigeria's distinct economic and market landscape, this study aspires to uncover invaluable insights into the behaviour of Nigerian REITs within diversified investment portfolios. By doing so, it contributes significantly to the enrichment of academic literature while equipping investors, both domestic and international, with a more nuanced understanding of the potential benefits and challenges posed by incorporating Nigerian REITs into their investment strategies.

Hence, this article contributes to the international REIT literature by providing empirically validated data on the risk-adjusted and diversification benefits of an emerging market REIT (specifically N-REIT) within the context of the emerging African REIT market. Specifically, the study aims to examine the diversification advantages of N-REITs when added to mixed portfolios. The research questions addressed in the study are as follows: What is the risk-adjusted performance of N-REITs during the study period, and do N-REITs offer diversification benefits in a mixed asset portfolio? The article is structured as follows: Section 2 provides a review of related literature; Section 3, outlines the methodology employed in the study, Section 4 presents the empirical results and discussion of findings, and Section 5 provides the conclusion.

Literature Review

Since its inception in the United States in 1960, Real Estate Investment Trusts (REIT) have proven to be a viable and profitable platform for a wide range of investors. The US REIT market has great dominance over other markets globally. Worldwide, over forty (40) countries have introduced REIT regimes in their respective real estate markets (with over 800 active REITs). The global REIT market is a substantial industry, with a market capitalization exceeding \$2 trillion, as reported by EPRA (2022). Notable REIT markets include Australia, Japan, and the United Kingdom (EPRA 2022). Marzuki and Newell (2020) highlight that emerging markets account for approximately 5% of the global REIT, with over 230 REITs and a combined market capitalization of approximately \$100.3 billion (EPRA, 2022). However, within the emerging markets, Africa appears to be lagging behind. South Africa stands out as the frontrunner in the region, having about 30 REITs and a market capitalization of around \$22 billion. Additionally, South Africa is the only African REIT market that qualifies as "transparent" in the JLL & LaSalle Global Transparency Index (JLL & LaSalle, 2022). The REIT market in Nigeria holds prominence as the second biggest market in Africa, established in 2007, and having a market capitalization of approximately \$215 million (EPRA, 2022).

Understanding the performance of Real Estate Investment Trusts (REITs) and their potential for delivering risk-adjusted returns has become a pivotal concern for investors and researchers alike. Extensive academic inquiry has been dedicated to comprehending the intricacies of REITs' performance across diverse markets, although the emerging African REIT market offers a relatively underexplored landscape for investigation.

Performance Evaluation Methodologies and the Emerging Market Dynamics

The evaluation of REIT performance has been a focal point in empirical research, and scholars have utilized various methodologies to capture their risk-return profiles. A prevalent metric for gauging performance is total returns, comprising capital appreciation and dividend yield. This metric, employed by previous studies, provides a comprehensive assessment of REITs' contribution to an investment portfolio (Liang & Dong, 2019; Koelbl, 2020).

Furthermore, risk-adjusted metrics such as the Sharpe ratio and Jensen's alpha have been utilized to contextualize returns within the framework of risk exposure. The Sharpe ratio, which measures the excess return per unit of risk, allows for the comparison of REITs against other asset classes, offering insights into whether their returns compensate for their inherent riskiness (Ayodele & Olaleye, 2016). Jensen's alpha, an extension of the Capital Asset Pricing Model (CAPM), assesses an asset's risk-adjusted performance by evaluating its returns in relation to its systematic risk (Li, Fong & Chong, 2017).

The study's focus on N-REITs within the emerging African REIT market is particularly salient given the distinct dynamics characterizing emerging economies. Emerging markets, compared to their developed counterparts, are often marked by greater macroeconomic volatility, regulatory uncertainties, and a higher degree of sensitivity to global economic fluctuations (Ogunba et al., 2021). Daniel's observation (2022) regarding the importance of understanding investment performance resonates deeply within the context of emerging markets. Investors in these markets are confronted with a unique set of challenges stemming from market volatility and structural deficiencies, underscoring the need for tailored analyses of REIT performance (Daniel, 2022). The exploration of N-REITs' risk-adjusted performance within the intricate fabric of the African REIT market is poised to unveil insights into their behaviour in this distinct market environment.

Exploring the persistence of REIT performance across various market conditions has also garnered scholarly attention. Research examining the persistence of returns, such as the autocorrelation of performance over time, can shed light on whether high-performing REITs sustain their outperformance or revert to the mean. This phenomenon, referred to as the "winner's curse," is particularly relevant in emerging markets where market inefficiencies and informational asymmetry may exacerbate the risk of overpaying for outperforming assets (Loo et al., 2016).

Market efficiency, as a critical factor influencing REIT performance, manifests differently in emerging markets due to the prevalence of information asymmetry and limited investor protection mechanisms (Ojo, et al., 2022). An examination of the extent to which African REIT markets adhere to market efficiency theories is vital for understanding how N-REITs' risk-adjusted performance aligns with market expectations.

In light of the above considerations, the investigation into the risk-adjusted performance of N-REITs holds significant implications for both investors and policymakers. As investors seek to optimize their risk-return profiles, insights into N-REITs' performance can guide allocation decisions. Policymakers, on the other hand, can utilize findings to fine-tune regulatory frameworks and investor protection measures, fostering a more conducive environment for REIT investment.

Diversification Benefits of REITs

The exploration of diversification benefits is paramount in understanding the potential advantages that REITs offer within mixed-asset portfolios. Diversification, a cornerstone of modern portfolio theory, seeks to mitigate risk by combining assets with dissimilar return patterns (Zhu, 2008). REITs, due to their unique characteristics and the nature of real estate as an asset class, have garnered substantial attention as potential diversification tools. The concept of diversification traces its origins to Harry Markowitz's pioneering work on portfolio theory. Markowitz's seminal contribution highlighted that by combining uncorrelated or negatively correlated assets, investors could achieve a reduction in portfolio risk without necessarily sacrificing returns. This theory laid the groundwork for the inclusion of assets like REITs in investment portfolios, as their returns exhibit varying degrees of correlation with traditional equity and fixed-income assets (Ayodele & Olaleye, 2016).

REITs, as securitized real estate investments, introduce a unique dimension to diversification. Real estate, characterized by its distinct risk-return profile, can offer valuable diversification benefits when combined with more traditional asset classes (Ntuli & Akinsomi, 2017). The inclusion of N-REITs within mixed portfolios can offer insights into the extent to which they contribute to diversification in the context of the African REIT market.

The potential of real estate, including REITs, to enhance diversification has been a central focus of academic inquiry. Researchers have emphasized real estate's ability to reduce portfolio volatility, enhance returns, and mitigate downside risk, particularly during periods of economic uncertainty (Ntuli & Akinsomi, 2007; Daniel, 2022). Real estate's unique attributes, such as low correlation with traditional asset classes, can contribute to improved risk-adjusted returns in mixed portfolios (Lin, Cho & Lee, 2019).

The work of Ntuli & Akinsomi (2017) in the South African context underscored REITs' role as return-enhancers in mixed-asset portfolios. However, as this study shifts its focus to Nigerian REITs, it raises the question of whether the diversification benefits observed in the South African context hold true for N-REITs within the African REIT market. The potential differences in economic conditions, regulatory frameworks, and market dynamics between these two African economies could result in varying diversification effects.

Emerging Market Dynamics and Market-Specific Factors

The shift from developed to emerging markets introduces a realm of distinctive dynamics and market-specific factors that significantly influence the performance and behaviour of REITs. The context of emerging African markets adds layers of complexity to the examination of N-REITs' risk-adjusted performance and diversification benefits.

Emerging markets, including African economies, are often characterized by heightened levels of market volatility, stemming from factors such as political instability, currency fluctuations, and

less mature financial systems. This volatility, while potentially introducing higher returns, also entails elevated risks that must be carefully considered when assessing N-REITs' risk-adjusted performance (Ogunba et al., 2021). Moreover, regulatory uncertainties within emerging markets can contribute to increased market frictions and information asymmetry. Regulatory changes and shifts in investor protection mechanisms can impact investor sentiment and asset valuation, thereby influencing N-REITs' performance dynamics (Daniel, 2022). Consequently, the exploration of N-REITs' risk-adjusted performance requires an intricate analysis that accounts for the idiosyncrasies of these emerging market environments.

Information asymmetry, a hallmark of emerging markets, can significantly affect the performance and behaviour of financial assets, including REITs. The dearth of transparent and reliable information can impede efficient pricing and lead to market inefficiencies. In such contexts, the risk-adjusted performance of N-REITs can deviate from expectations due to the prevalence of information asymmetry and the lack of robust investor protection mechanisms (Olaleye & Ekemode. 2014; Ojo, et al. 202).

Market-specific regulations and institutional structures play a crucial role in shaping REIT behaviour. The African REIT market, including Nigeria, is characterized by its own regulatory framework that governs the creation, operation, and oversight of REITs. The degree of regulatory alignment with international standards, as well as the robustness of regulatory enforcement, can influence N-REITs' performance and behaviour (Daniel, 2022).

African Market-Specific Factors

The examination of diversification benefits in the African REIT market necessitates consideration of market-specific factors. Emerging markets, including African economies, have unique economic and regulatory characteristics that can influence diversification outcomes. The scarcity of comprehensive research within the African REIT context underscores the novelty and importance of investigating N-REITs' diversification benefits.

Ogunba et al. (2021) and Daniel (2022) have contended that the generalizability of findings across diverse markets is challenged by factors such as regulatory variations, market maturity, and geographic limitations. African economies, characterized by a diverse range of macroeconomic indicators, regulatory environments, and investor protection mechanisms, necessitate an examination of N-REITs' diversification potential within this specific market milieu.

The investigation into the diversification benefits of N-REITs holds considerable implications for investors, portfolio managers, and policymakers. Investors seeking to optimize their portfolios can benefit from insights into the degree to which N-REITs contribute to diversification, particularly in an emerging market context. Portfolio managers can utilize these findings to tailor their asset allocation strategies, accounting for the potential diversification benefits offered by N-REITs.

Moreover, the outcomes of this investigation can guide policymakers in shaping regulatory frameworks and incentives to foster REIT development and investment within the African context. By understanding the diversification attributes of N-REITs, policymakers can create an

environment that encourages the integration of these instruments into investment portfolios, thereby contributing to the overall development of the African REIT market.

African REIT Market

The African REIT market remains an underexplored terrain within the broader realm of international real estate research. While studies have emerged focusing on specific African countries, such as the study by Ntuli & Akinsomi (2017) in South Africa, there exists a conspicuous research gap surrounding the diversification benefits of African REITs within mixed-asset portfolios. This section elucidates the novelty and significance of investigating N-REITs' behavior and performance within the African REIT market.

Previous studies conducted in the African REIT context have primarily centered on return performance, investment uncertainties, and macroeconomic factors (Ntuli and Akinsomi, 2017; Akinsomi et al., 2018; Daniel, 2022). However, the exploration of how N-REITs contribute to portfolio diversification remains a relatively uncharted territory. The analysis of N-REITs' diversification benefits is integral in comprehending their potential for risk reduction and enhanced risk-adjusted returns within mixed portfolios.

The dearth of comprehensive research on N-REITs' diversification benefits signifies a significant gap in the existing body of knowledge. This study, by delving into this specific aspect, is poised to contribute pioneering insights into the African REIT landscape, offering investors and practitioners a more holistic understanding of N-REITs' behaviour within diversified portfolios.

African economies are characterized by their own unique economic, regulatory, and political dynamics that distinguish them from their global counterparts. While some research has been undertaken in specific African countries, such as South Africa, the broader African REIT market remains relatively unexplored in terms of its diversification attributes.

The disparities in regulatory frameworks, market maturity, investor protection mechanisms, and property rights across African countries introduce nuances that can significantly impact N-REITs' behaviour and performance within diversified portfolios. The study's focus on the Nigerian REIT market, distinct from the South African context, is poised to unravel insights that can only be gleaned from a more extensive exploration of African market-specific factors.

The exploration of N-REITs' diversification benefits has direct implications for investment practitioners seeking to optimize their portfolios in the African context. The findings of this study can guide investment decisions by providing empirical evidence of N-REITs' role in enhancing risk-adjusted returns and reducing portfolio volatility. Portfolio managers, armed with insights into the diversification benefits of N-REITs, can construct more robust and resilient investment portfolios.

Moreover, policymakers, regulators, and market participants can benefit from the outcomes of this study. By understanding the nuances of N-REITs' behaviour and their potential contributions to

diversified portfolios, policymakers can formulate regulatory measures that foster a conducive environment for REIT development and investment in African markets. Additionally, the study's findings can inform market participants about the potential advantages of integrating N-REITs into their investment strategies.

Nigerian REIT Landscape

The inception of Real Estate Investment Trusts (REITs) in Nigeria commenced with the introduction of the Skye Shelter Fund in 2007, accompanied by an initial capitalization of approximately \$6.5 million. Officially listed on the Nigerian Stock Exchange (NSE) on February 28th, 2008, it marked the advent of REITs in the Nigerian market. The subsequent addition of the Union Homes REIT in 2008, with a market capitalization of around \$40.8 million, expanded the landscape. The most recent addition, the UPDC REIT, was introduced in 2013, carrying a market capitalization of about \$87.2 million. Cumulatively, these three active N-REITs constitute an aggregate market capitalization of approximately \$134.6 million and are mainly operating in the residential and commercial real estate sectors (Daniel, 2022). The current share prices of the aforementioned REITs as at August 2023 are N83.80; N36.60 and N3.65 for the Sky Shelter Fund, Union Homes and UPDC REITs respectively.

Nigeria, often referred to as the "giant of Africa," possesses a significant population of approximately 200 million people and is recognized for its rapidly growing economy. However, according to JLL & LaSalle Global Transparency Index (2022), Nigeria is classified in the "low transparency tier" having a composite score of 3.60, making it the 60th when ranked globally. Daniel (2022) suggests that the Nigerian property market has consistently attracted capital inflows over the past decade from different categories of investors. The establishment of N-REIT was aimed to expand the investment opportunities available in the Nigerian real estate sector. However, there is a lack of information regarding N-REITs, which has motivated the authors of this article to address this identified gap.

Methods

The Data

The study collected secondary data from various sources, including annual reports and online databases of the respective REIT companies in Nigeria (Sky Shelter Fund, Union Homes and UPDC). Relevant data obtained were the share prices and dividends from the respective companies which were subsequently used to compute the holding period returns of the investment. The 90-day T-Bills data and the Nigerian Federal Government's 5-year Bond (FGB) were obtained from the database of Nigeria's Central Bank. The All-Share Index (ASI) data were sourced from the Nigerian Stock Exchange database. The study period spanned from 2008 to 2019, chosen based on data availability.

Risk-Adjusted Performance Analysis

The data were used to calculate the holding period returns for the investment assets during the study period. Additionally, risk-adjusted returns were calculated to assess the performance of the assets. The holding period return, which measures the actual rate of return achieved from an investment over a specific period was used because it considers changes in dividends and the capital appreciation or depreciation of the investment. To measure the risk-adjusted returns of N-the investments, several metrics were employed, including the return-risk ratio, the coefficient of variation, and the Sharpe Ratio. These metrics refine the investment's return by considering the level of risk associated with generating that return over the investment period.

Trend Analysis

In this study, trend analysis was employed to visually depict trends in the datasets utilized, aiding in the analysis of future predictions. Trendlines were plotted to show the pattern or trend more clearly, and the moving average of these trendlines was applied to smoothen out data fluctuations. The R² value, also known as the coefficient of determination, was utilized to assess the reliability and accuracy of the trend and forecast or predictions. An R² value close to 1 indicates a highly accurate trendline. Additionally, least square linear regression equations were generated to make predictions on return values.

Unit Root Analysis

To evaluate the stationarity properties of the datasets used in this study, a unit root test was performed. The unit root analysis employed the Philip-Perron (PP) model, which is particularly suitable for testing short time-series datasets, as suggested by previous research (Arltova & Fedorova, 2016). The PP test statistics were computed using a model that includes both a trend and an intercept, providing insights into the order of integration (I (0)) of the data series.

Diversification Analysis

The study employed mean-variance portfolio optimization to construct a three-asset portfolio. This approach utilizes historical return data, risk measures, and correlation coefficients among the assets. The objective is to find the optimal allocation of assets that maximizes expected returns while minimizing portfolio risk. By considering the historical performance, risk levels, and the interrelationships between the assets, the mean-variance portfolio optimization helps in creating an efficient portfolio that balances risk and return. Two portfolios were subsequently developed to assess the benefits of N-REITs' inclusion in the mixed assets portfolio. In the first portfolio, all the assets were not constrained to any limit. However, in the second portfolio, N-REIT was constrained to a maximum of 5% allocation.

Findings

To obtain the return-risk performance of the selected assets, first, the Holding period return (HPR) of the assets were obtained. The study obtained the necessary Treasury Bill (T-Bill) rates for the specified study period from the Central Bank of Nigeria database. These rates were collected to analyse and incorporate the risk-free rate of return into the investment analysis and calculations. By using the T-Bill rates from the Central Bank of Nigeria, the study ensured the inclusion of accurate and reliable data for assessing the risk-adjusted returns and performance of the investment assets. All the datasets obtained were first subjected to a unit root test to ascertain the stationarity characteristics of the dataset.

Table 1 Phillips-Perron unit root test on the performance of N-REITs

			ASI	FGB	REITS
<u>At Level</u>	With Constant	t-Statistic	-11.2615	-2.4282	-11.6745
		Prob.	0.0000	0.1359	0.0000
			***	n0	***
	With Constant & Trend	t-Statistic	-11.2624	-2.807	-11.961
		Prob.	0.0000	0.1973	0.0000
			***	n0	***
Without Constant & Trend	t-Statistic	-11.294	-0.3667	-11.4096	
	Prob.	0.0000	0.5510	0.0000	
		***	n0	***	
<u>At First Difference</u>	With Constant	t-Statistic	-59.9734	-10.9406	-45.1815
		Prob.	0.0001	0.0000	0.0001
			***	***	***
	With Constant & Trend	t-Statistic	-58.1839	-10.9319	-47.186

	<i>Prob.</i>	0.0001	0.0000	0.0001
		***	***	***
Without Constant & Trend	t-Statistic	-60.4079	-10.9846	-45.5952
	<i>Prob.</i>	0.0000	0.0000	0.0000
		***	***	***

Notes

Null Hypothesis: the variable has a unit root

a: (*) Significant at 10%; (**) Significant at 5%; (***) Significant at 1% and (no) Not Significant

b: Lag Length based on SIC

c: Probability based on MacKinnon (1996) one-sided p-values.

Table 1 displays the results of the unit root test, which was conducted to assess the stationarity properties of the datasets utilized in the study. The Philip-Perron (PP) model was employed for the unit root analysis, as it is suitable for testing short time-series datasets, as suggested by previous studies like Arltova & Fedorova (2016). The PP test statistics were calculated using a model that incorporates both a trend and an intercept, and they indicate the order of integration (I(0)) of the data series. The findings revealed that all the datasets exhibited statistically significant stationarity at the first difference. Therefore, the null hypothesis (Ho) of a unit root (non-stationarity) can be rejected for all the data series. This implies that the data series are stationary after taking the first difference, and they are integrated of order I(0) (not integrated). The significance level for the stationary series was established at the 1% critical values.

Table 2: Descriptive statistics

	Minimum	Maximum	Sum	Mean	Std. Deviation
REITS	-29.68	17.43	99.34	0.69	4.24
FGB	4	16.99	1798.4	12.49	2.78
ASI	-30.64	38.2	-35.78	-0.25	7.69

The results in Table 2 offer some understanding of the nature of the dataset in the form of the minimum and maximum values, means and standard deviations. The trend analysis is presented in Figure 1 below.

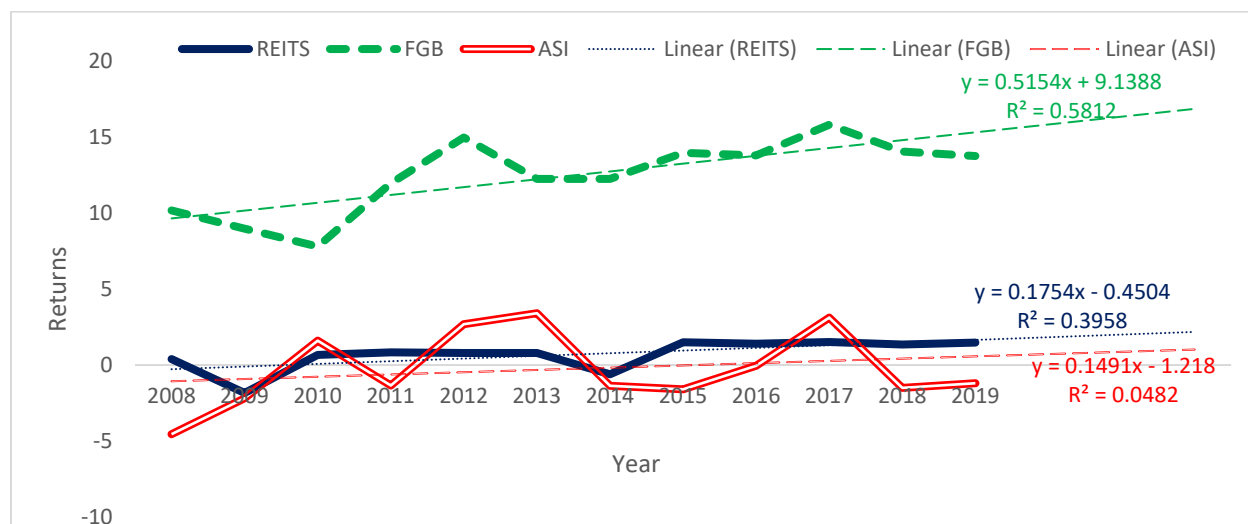


Figure 1: Trend analysis of holding period return on N-REITs, FGB & ASI

From the trendlines in Figure 1, it becomes evident that the asset classes depicted in the trendlines experienced relatively low volatility in their respective returns. However, the All-Share Index (ASI) exhibited a higher level of volatility in comparison to other assets. The smoothed trendlines indicate a slight yet consistent and steady increase in the returns provided by all the assets. Examining the five-year forecast period (2020 to 2024), it is apparent that the forecasted returns display a slightly consistent and steady upward trend throughout the projected years. However, it's important to note that these are forecasts and are subject to potential uncertainties. The reliability of the trends and the accuracy of the forecasts, as determined by the R2 value, are as follows: 58.128% for the FGB, 4.82% for the ASI, and 39.58% for the REITs. These values suggest varying reliability and accuracy in predicting future returns for the respective assets. Additionally, the least square regression equation employed in the analysis can be utilized to make predictions beyond the timeframe covered in this study, offering potential insights for future periods.

Table 3: Return-Risk performance

Assets	Total Return	Total Risk	Return Risk Ratio	Coefficient of Variation	Sharpe Ratio
REITs	0.69	4.24	0.23	6.14	-2.05
FGB	12.49	2.78	4.49	0.22	1.13
ASI	-0.25	7.69	-0.08	-30.8	-2.25
Mean	4.31	4.90	1.55	-8.13	-1.06

Based on the findings presented in Table 3, several observations were made. Firstly, the Federal Government Bonds (FGB) demonstrated the highest return of 12.49% with the lowest level of risk at 2.78. On the other hand, Real Estate Investment Trusts (REITs) provided the second-best return at 0.69% with a risk level of 4.24. The All-Share Index (ASI) exhibited the lowest return of -0.25% with the highest level of risk at 7.69.

In terms of risk-adjusted measures, the FGB showed a return-risk ratio of 4.49, a coefficient of variation of 0.22, and a Sharpe ratio of 1.13. In contrast, the N-REITs had a return-risk ratio of 0.23, a coefficient of variation of 6.14, and a Sharpe ratio of -2.05. The ASI had a return-risk ratio of -0.08, a coefficient of variation of -30.8, and a Sharpe ratio of -2.25. The mean return values obtained within the study's time frame were 4.31, 4.90, 1.55, -8.13, and -1.06 for total return, total risk, return-risk ratio, coefficient of variation, and Sharpe ratio, respectively. Notably, the N-REITs had positive but relatively low return values.

These findings have important implications for domestic and foreign investors, emphasizing the need for a comprehensive evaluation of the potential returns and risks associated with investing in REITs. It is crucial for investors to exercise caution and conduct thorough analysis before making investment decisions in the REIT market. By considering both returns and risks, investors can make more informed choices and align their investment strategies with risk tolerance levels and financial goals. While REITs offer the opportunity for attractive returns, it is equally important to assess the inherent risks involved in the real estate market and the specific dynamics of each REIT. Investors have varying risk tolerance levels due to differences in risk aversion, and this should be considered when making investment decisions. It is interesting to note that the findings in this study contradict those from other REIT industries in emerging markets like South Africa and

Malaysia (Zhu, 2008; Aik, 2012; Naido, 2014). This indicates that the observed performance of REIT in Nigeria is not necessarily representative of a general phenomenon in emerging markets, but that results can vary significantly across different emerging market contexts. It is essential to recognize that the dynamics and characteristics of each market, including factors such as regulatory frameworks, economic conditions, and investor preferences, can contribute to the unique performance of REITs in a specific country or region. Therefore, the findings of this study highlight the need to consider the specific context and market conditions when analysing the performance of REITs in different regions, as generalizations based on other emerging markets may not hold true in all cases.

The findings of this study were also observed not to be a global REIT market phenomenon, as the results also disagree with studies conducted in REIT markets of developed nations such as the US (Jackson, 2008), where REITs were seen to perform well. Neither was it a time-frame phenomenon as REITs industries of Germany, Malaysia and the UK (which started the same time with Nigeria, i.e. in 2007) were observed to have performed better within the same time frame of this study. Therefore, these findings suggest that the performance of REITs is not universally consistent across emerging markets, developed nations, or specific time frames.

Effects of N-REIT in the mixed asset portfolio

The study examined the effect of N-REIT in a mixed asset portfolio under two scenarios. The first portfolio developed was unconstrained. For the second portfolio, while N-REIT was constrained to a maximum of 5% allocation, the other assets were not constrained. The constraints on N-REIT were set based on the maximum allowable limits set for pension fund portfolio managers in Nigeria to expose their assets to real estate. This perhaps owes to the peculiar market volatility and the infantile nature of Nigeria's indirect real estate assets.

The examination of the unconstrained portfolio (see Figure 2) shows that increasing allocation to N-REITs up to 28% allocation had both return and risk reduction effects. While portfolio return decreased from 12.49% to 8.85%, portfolio risk reduced from 2.78% to 2.41%. An examination of the return-risk ratio showed a corresponding decrease from 4.49% to 3.67%. Further, increase in the percentage allocation to N-REIT

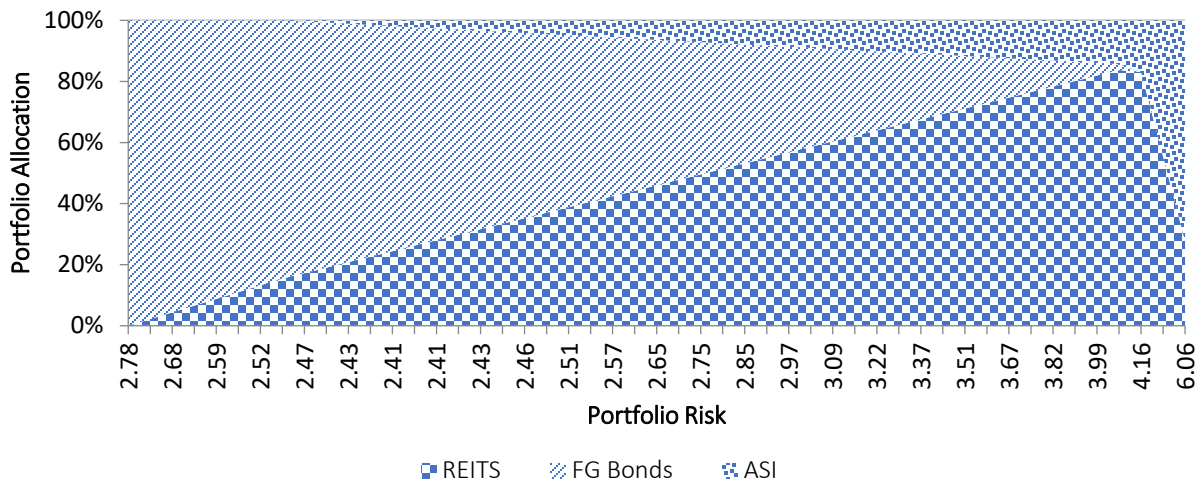


Figure 2: N-REITS Unconstrained Portfolio Asset

An examination of the constrained portfolio (see Figure 3) shows that with an increased allocation to N-REITs from 0.00% to 0.05%, portfolio risk and return reduced from 2.78% to 2.59% and 12.49% to 10.93%, respectively. The return risk ratio also decreased from 4.49% to 4.21%. A comparison of the two portfolios (constrained and unconstrained) based on the return risk ratios showed that including N-REITs beyond the 5% threshold might not yield optimal portfolio performance. However, an examination of the weightage of other assets in the portfolio suggests that the effectiveness of the N-REITs in the portfolio also depends on the percentage allocation to other assets. This, thus, imply that the return and risk characteristics of the other constituent assets and the investment objectives could significantly influence the portfolio strategy to be adopted. In comparison, the South African Market showed that the inclusion of REITs in a mixed asset portfolio provided return enhancement (Ntuli & Akinsomi, 2017).

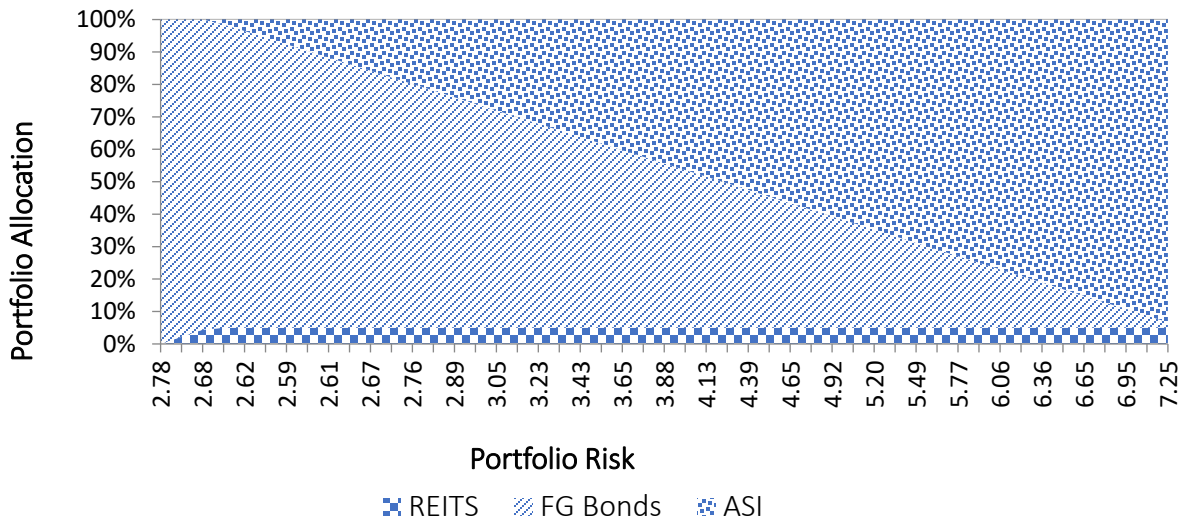


Figure 3: N-REITS Constrained Portfolio Asset

Conclusion

REITs play a crucial role in providing liquidity to property markets globally, particularly in emerging economies. This investment vehicle offers investors an opportunity to participate in the real estate sector without directly acquiring physical properties or investing in non-listed property funds. The present study examined the diversification benefits of REITs within the context of an emerging economy. By exploring the effects of an emerging market REIT in a mixed asset

portfolio, the study aimed to enhance understanding of the dynamics and implications of including REITs in investment portfolios.

The results of this study revealed that the returns on the various asset classes were relatively stable. The small but persistent and steady rise observed in all asset returns will likely be sustained over the next five years (2019 to 2024). N-REIT have provided the second-best overall return (0.69 per cent) and are the second-riskiest asset, with a risk level of 4.24 over the last twelve years. Despite having positive return values, N-REITs' performance is found to be lower compared to REITs from other emerging markets.

Furthermore, the return risk ratios showed that including N-REIT above the 5% threshold did not result in optimal portfolio efficiency. The study also discovered evidence that the attributes (percentage allocation, risk and return profile) of the constituent assets affects N-REIT's efficacy. A comparison of the two portfolios (constrained and unconstrained) based on the return risk ratios showed that including N-REIT beyond the 5% threshold might not yield optimal portfolio performance. However, examining the weightage of other assets in the portfolio suggests that the effectiveness of N-REIT in the portfolio also depends on the percentage allocation to other assets. This thus implies that the return and risk characteristics of the other constituent assets and the investment objectives could significantly influence the portfolio strategy to be adopted. As a result, the return and risk characteristics of the other constituent assets and the investment goals will substantially impact the portfolio strategy chosen.

Based on the empirical analysis conducted in this study, it was found that N-REIT, as a listed property investment scheme, have a positive impact on a mixed-asset portfolio, contributing to the risk-return characteristics of the overall portfolio. These findings provide valuable insights for both domestic and foreign investors, as well as institutional and retail investors, enabling them to make more informed and realistic property investment decisions within the context of N-REIT. The introduction of the REIT regime has played a significant role in enabling emerging property markets, including Nigeria, to fully unlock the investment potential of their real estate assets. N-REIT have provided a viable avenue for investors to participate in the property market without direct ownership or investment in non-listed property funds. This has contributed to increased liquidity and efficiency in the property market, attracting capital inflows from various investor categories.

To further strengthen investor confidence and trust in the N-REIT market, it is crucial for public administration at all levels to prioritize initiatives aimed at improving institutional and economic standards in Nigeria. This includes enhancing regulatory frameworks, ensuring transparency and disclosure requirements, and fostering an environment conducive to sustainable growth and development of the REIT market. By reinforcing investor trust and improving the overall investment climate, Nigeria can continue to harness the full potential of N-REIT and attract both

domestic and foreign investors seeking to diversify their portfolios and participate in the promising real estate sector.

It is important to acknowledge the limitations of this study. One significant limitation is the relatively small number of observations in the dataset, which was constrained by data availability. This is primarily due to the nascent stage of the REIT market in Nigeria compared to more established markets like the United States and the United Kingdom. As a result, there is limited historical data on N-REIT, which may impact the robustness and generalizability of the findings. With time, and as the Nigerian market matures, a more comprehensive dataset encompassing a larger timeframe would provide a more robust and comprehensive understanding of the dynamics and performance of the REIT market in Nigeria.

Future research could focus on expanding the dataset by including more years of data as they become available. It is crucial for researchers and market participants to recognize the evolving nature of the Nigerian REIT market and continue to gather and analyse data as it becomes available. This will contribute to a deeper understanding of the market's performance, facilitate better decision-making, and foster the development of a robust and transparent REIT market in Nigeria. Additionally, incorporating data from other emerging markets with well-established REIT markets could provide valuable insights and comparisons.

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Professional Perspective on Contemporary Valuation Techniques in Tanzania: the case of Hedonic Pricing Method

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Abstract

The property valuation industry has embraced various approaches to improve accuracy and provide clients with up-to-date property market information. One such approach is the Hedonic Pricing Method (HPM), which values properties by considering how the public values neighborhood features. Despite HPM's growing influence in global South countries like Nigeria and South Africa, it has received little attention from professional valuers and researchers in Tanzania. This study emphasizes the need for valuers to understand clients' perceptions of property attributes to analyze and interpret the property market effectively. The study evaluates the awareness and adoption of HPM among professional valuers in Tanzania. Data was collected from distributed questionnaires to registered valuers, and statistical analysis was conducted using SPSS software. The findings indicate that most practitioners in Tanzania are unaware of HPM and have not used it in practice. However, they express interest in acquiring knowledge and applying HPM to interpret property values. The study concludes that, when other requirements of understanding and adopting contemporary valuation techniques are met, adoption of HPM will be achieved which will assist in bridging the gap between theory and practice to achieve sustainable property valuation practices.

Key words: HPM; Property Valuation; Sustainability; Neighborhood Attributes; Tanzania

Introduction

The development of modern property valuation practices is highly embedded in the idea that real estate properties are composite goods made up of a variety of distinct features that determine their worth (Abidoye & Chan, 2017). The value that is attached to the property or an asset is highly impacted by unique attributes (Camis-Esakov & Vandegrift, 2018), the uniqueness of the stakeholders (Chen & Jim, 2010), and the heterogeneity nature of the real estate properties (Zhang & Yi, 2017). Therefore, towards attaining valuation accuracy, researchers and professional valuers have developed various multifarious methods which can be used to ascertain the pecuniary value of non-market goods and services i.e., Travel Cost Method, Contingent Valuation Method, and/or the Hedonic Pricing Method (Dahal, et al., 2019).

One of the methods which have been used in practice (in developed economies) is the Hedonic Pricing Method (Huang, et al., 2017), which takes into consideration all marketable and non-marketable features with implications for the value of the property (Abidoye & Chan, 2017). The assumption of this model is, the property buyers pay for more than just the property itself (Liang, et al., 2018), but also other physical and spatial features (McCord, et al., 2018; Efthymiou and Antoniou, 2013; Conroy & Milosch, 2011). The model in practice is mostly used to develop value estimation from the features which indirectly affect its market price, hence trying to bridge the gap between conservative valuation models and modern practices.

The pioneers of the Hedonic Pricing Method (HPM) such as Lancaster (1966) and Rosen (1974) argued that the perfect knowledge of the model is beneficial at the macro-economic level (Fernandez and Bucaram, 2019) as it impacts policymakers, real estate investors, planners, computer scientists, and other stakeholders in housing market sector. At market equilibrium, the model covers structural attributes (Tian, et al., 2017; Yuan, et al., 2018; Lasszkiewicz, et al., 2019; Wen, et al., 2019), utility attributes (Kim, et al., 2015), environmental attributes (Dahal, et al., 2019; Fernandez and Bucaram, 2019; Lasszkiewicz, et al., 2019), accessibility attributes (Efthymiou and Antoniou, 2013), service attributes (Wen, et al., 2019), commercial attributes (Lin and Yang, 2019), and landscape (Wen, et al., 2015). The model can be used in consumer market research (Hirschman and Holbrook, 1982), assessment of property tax using ad-valorem (Berry and Bednarz, 1975), calculating consumer price indices (Moulton, 1996), valuation of electronic devices (White et al, 2004), and valuation of automobiles (Cowling and Cubbin, 1972).

For the past 10 years, Tanzania has been striving to increase the accuracy of property valuation practices through writing its first and implementation of the Valuation and Valuers Registration Act, (2016) and Regulations, formulation and Valuers Registration Board (VRB), adoption of International Valuation Standards (IVS), and International Financial Reporting Standards (IFRS) (Komu, 2017). Despite these and many other achievements in training, registering, and regulating harmonized property valuation practices in the country, there is a lag in the adoption of contemporary valuation practices theoretically and practically (Mwasumbi, 2014). This is evident in practice as little to no research has been conducted so far in the harmony of trying to adjust HPM with the local context environment to implement it in practice.

Komu (2017) underlines the failure of professional valuers to analyze the value of properties by evaluating their existing status and impacts on future values. The inability of professional valuers to factor valuation uncertainty can be bridged by the use of HPM through modeling neighborhood characteristics as a determinant of price or rent (Adair & McGreal, 1996). However, professional valuers are limited by the current state of information management and sharing between cooperating sectors which hinders their ability to use contemporary methods.

The objective of this study is to objectively assess the current state of professional valuers' understanding and use of HPM in Tanzania. The study also highlights the difficulties professional valuers face in putting the model into practice and the significance of doing so once they have acquired an understanding of HPM. To the best of our knowledge, Tanzania has not previously conducted a study with the same objectives, which intends to serve as a framework for streamlining contemporary property valuation methods.

Literature Review

Ridker and Henning (1967) suggested that it was the first analysis of HPM in property valuation when was applied to ascertain the effect of air quality in residential property valuation. However, later studies by Bruce and Sundell (1977) argued that the HPM application in real estate valuation was first introduced in the 1920s. The same stance was supported by Colwell and Dilmore (1999) reporting that the first application of HPM in property pricing appraisal goes back to as early as the 1920s when Haas (1922) employed the method to value farms in Minnesota, United States.

Nonetheless, it is still a matter of scholarly dissension as to whom exactly introduced HPM (Harath and Maier, 2010).

Studies by scholars (i.e., Houthakker, 1952; Oates, 1960; Becker, 1965; Muth, 1966; and Lancaster, 1966) were the first to adopt HPM in real estate appraisal through interpretation of the Court (1939) model which aimed solely on pricing index of automobiles. Later, Rosen (1974) developed the standard economic theory of HPM in property valuation as inspired by the aforementioned scholars. Rosen's study leads to the development of the hedonic equation and derivation of the implicit price of property characteristics as the partial derivative of the hedonic equation concerning that characteristic. Rosen's theory pioneered the adoption of HPM in real estate valuation around the world (i.e., Adair, et al., (1996); Tse and Love (2000); Paz (2003); Mbachu and Lenono (2005); Cebula (2009); Ge (2009); Selim (2008); Ong (2013); Mallick and Mahalick (2015); and Abidoeye and Chan (2017)).

Various attempts have been made by scholars in developed economies for the past 100 years to review studies that adopted HPM in property valuation (Abidoeye & Chan, 2017). The authors of these studies in the early years (before 1954, between 1955 and 1964, and between 1965 and 1977) in the United States applied HPM in rural farms, urban bare plots, single-family residential properties, and multi-family residential properties (Bruce & Sundell, 1977). However, it was noted that during that time, the adoption was less popular due to handling of model's mathematics manually, since there was an unavailability of computers (Harath and Maier, 2010). Further studies were conducted in Northern Ireland (Adair & McGreal, 1996), Spain (Paz, 2003), the United States (Sirmans, et al., 2005), and New Zealand (Ge, 2009).

The dire changes over the past 20 years around HPM (i.e., application and ensured impacts) in the entire property valuation practices have led to design increased efficiency and reforming monitoring. This has also been geared by the increased application of big data in computer applications and the use of. These changes call for attempts by both professional valuers and academia to pay attention to the achievements made by contemporary valuation techniques in the real estate realm. This study reviews HPM resources, the existing practices, and the perception of professional valuers toward property valuation reform. To the authors' knowledge, however, the number of studies that systematically investigate HPM and the progress it has made in property valuation in developing economies is limited.

The HPM has been widely used for valuing property prices based on locational factors, housing structure, and neighborhood features. This makes the method more flexible and intuitive compared to the most used traditional methods (i.e., market comparison, income method, and replacement cost method). The use of this method in recent development enables us to observe the impact of increasing or decreasing values of variables in the modeling process. The favorability of HPM over other methods by scholars (...) is limited by the evolving nature of the model itself and the changing nature of the real estate and the big data era. al in the new era (...). Therefore, the HPM in the new era has attracted and integrated the advanced theoretical achievements of many disciplines and is continually improving and innovating based on actual demand.

Most cited research articles and literature related to HPM in property valuation are conducted in developed economies with different environments to the economy of Tanzania. Studies have also been conducted in global south countries i.e., South Africa and Nigeria, as mentioned above, but these studies are still few to cover and cite ways in which HPM could be modeled in Tanzania's real estate industry. This study aimed at evaluating professional valuers' perception of HPM in Tanzania since the method is highly relied upon in modern research studies on sustainable property investment, development, and market. This will pave the way for extensions and innovations of the existing mainstream HPM and new techniques respectively in which researchers, economists, and professional valuers can deal with the heterogeneity of the real estate market in the wake of emerging global challenges i.e., climate change.

Methods

This study collected and analyzed data from professional valuers in Tanzania. The Valuers Registration Board's (VRB) category classification of professional valuers was used to determine the sample size, which was then determined using stratified random sampling. This was accomplished by classifying the population of fully registered valuers (FRV), provisionally registered valuers (PRV), and technician valuers (TV) into the three groups mentioned above. The study population consisted of 885 registered valuers, categorized as 240 FRVs, 601 PRVs, and 44 TVs. To estimate population parameters, random selection from each stratum was carried out and pooled into a single research sample. A total of (89) questionnaires were distributed by the researcher, and fifty (50) of those were completed and returned. More than the satisfactory response rate of 50% or more (Dillman, 2000) and between 18% and 60% (Morton et al., 2012), the response rate of 56.2% is present.

In addressing the study, the survey questionnaire of closed-ended questions was designed containing two sections. In the first part, the professional valuers were asked to provide information about their demographic characteristics in terms of educational qualifications, professional status, years of industry cognitive experience, and area of specialization, amongst other information. The following section of the questionnaire survey was for assessing the relationship between research and practice (Hemsley-Brown & Sharp, 2003), and for the awareness and readiness of Tanzanian valuers to adopt the use of HPM in Tanzania. The response of the respondents was received on a five-point Likert scale with options that range from 1 to 5, representing 'strongly disagree' to 'strongly agree', respectively.

To meet the study's research objectives, descriptive and inferential statistics and analysis methods were used. The statistical analysis methods used to analyze the acquired data and draw inferential conclusions from the questionnaire surveys are Mean Score (MS), coefficient of variation (COV), and chi-square test. These statistical analyses were carried out using SPSS software version 20.0 (SPSS Inc., Chicago, USA). Data was coded in Microsoft Excel (Microsoft, USA) before being imported into the SPSS software for analysis and certain calculations.

Findings and Discussion

Professional Valuers Profile

Table 1 below illustrates the profile of the respondents which determines the reliability of the information obtained from the survey. The technical certificate or ordinary diploma represented by 8% of the respondents is the lowest qualification required for practice in VRB, albeit this option is less common due to the tasks and functions allocated to it by legislation (Valuation and Valuers Registration Act, 2016). A total of 76% of the respondents possess a Bachelor's Degree, while only 16% of the respondents pursued Postgraduate studies, which implies that professionals are developing themselves academically at a staggering rate. Furthermore, almost all respondents, 96% indicated to have registered with the VRB, which is mandatory for one to practice in the country. In addition, 76% of the respondents have registered with a local real estate association (Association of Real Estate Profession in Tanzania – AREPTA), but only around a quarter of the respondents were members of both local and international valuation bodies (i.e., AfRES and RICS) which suggests that Tanzanian professional valuers have not broadened their practice beyond borders and collaborated with international valuation bodies to enhance practice.

In terms of years of professional experience which suggests additional empirical skills, knowledge, and understanding of the property market, findings illustrate a total of 58% of the professionals have been practicing in the industry for less than 6 years which indicates that they are new in practice. Also, 32% of the respondents have been practicing in the industry for between 7 and 12 years. The remaining 10% of the respondents possess over 13 years of industry experience. Since the majority of the professional valuers have below 6 years of industry experience, it can be reasonable to assume that most of them are middle-aged and fresh from school, hence are expected to have a good theoretical perspective of the current development in the real estate profession globally, especially of the likelihood of an affinity for the trending contemporary professional valuation practices.

Table 1: Professional Valuers Profile

Variable	Frequency (n)	Percentage (%)
<i>Educational Qualifications</i>		
Technician Certificate	3	6%
Ordinary Diploma	1	2%
Bachelor Degree	38	76%
Postgraduate Degree	8	16%
Total	50	100.0
<i>Membership Status with VRB</i>		
Technician Valuer	3	6%
Professionally Registered Valuer	28	56%
Full Registered Valuer	17	34%
Not Registered	2	4%
Total	50	100.0
<i>Membership in other Professional Bodies</i>		
AREPTA	38	76%
AfRES	6	12%
RICS	3	6%

None	3	6%
Total	50	100.0
<i>Years of industry experience</i>		
0-6 years	29	58.0
7-12 years	16	32.0
13-18 years	5	10.0
19 years and above	0	0.0
Total	50	100.0

Sources: Authors construct (2023)

Awareness of HPM in Tanzania

The findings of the study as illustrated in Table 2 below aimed at ascertaining professional valuers' awareness of HPM and other issues related to it as indicated in the literature review above. More than 46% of the professional valuers either strongly disagree or disagree to be aware of HPM, while 34% are neutral on the issue. On the frequency of use of HPM, no respondent (0%) of the professional valuers indicated adopting this technique in practice. This is contrary to the finding of Abidoye (2017) who concluded that HPM is one of the most widely adopted techniques for assessing environmental factors in the global south. Further, it is indicated that the low usage of these techniques may be connected to a lack of textbooks and research journals that reflect the significance of using the method in the Tanzania property market. More than 50% of the professional valuers indicated this by strongly disagreeing or disagreeing in the questionnaire survey. It is expected that professional valuers to be influenced to use various techniques and methodologies after they have been intensively researched and backed by models which reflect the local property market. However, in a situation where there is no collaboration between researchers and practitioners, professional valuers have to learn by themselves on the job by attending workshops, seminars, training, and conferences.

Furthermore, to findings further indicates that more than 70% of the professional valuers are willing to acquire the know-how of the HPM, whereas about 68% asserted their readiness to adopt the method in practice. This willingness of the professional valuers should be harnessed by the relevant academic institutions, professional bodies, and other real estate stakeholders, and this would expose professionals to global property valuation practices.

Table 2: Awareness of HPM in Tanzania

Statement	Level of agreement (%)					Mean score	Standard deviation
	SD	D	N	A	SA		
Professional valuers are aware of HPM	30.0	16.0	34.0	16.0	4.0	2.48	1.199
Professional valuers use HPM in practice	54.0	22.0	14.0	10.0	0.0	1.80	1.030
Were introduced to HPM while in school	34.0	20.0	20.0	16.0	10.0	2.48	1.374

VRB or AREPTA do organize conferences, seminars/workshops where HPM is discussed	42.0	22.0	16.0	6.0	14.0	2.28	1.429
The basics of HPM are well documented in valuation textbooks and journal articles	36.0	14.0	18.0	20.0	12.0	2.58	1.458
Valuers' willingness to acquire the know-how of application of HPM	12.0	4.0	14.0	12.0	58.0	4.00	1.414
Valuers will adopt HPM in practice after acquiring the know-how	8.0	4.0	20.0	18.0	50.0	3.98	1.270

Note SD – Strongly disagree, D – Disagree, N – Neutral, A – Agree, SA – Strongly agree
Sources: Authors construct (2023)

Further, the study tested the significant relationship between professional valuers' willingness to learn and adopt HPM in relation to their profile. The three distinctive features were educational qualifications, membership with professional bodies, and years of industry experience. This test aimed at obtaining a specific area to achieve objective transformation of property valuation practices towards modernity. Table 3 below illustrates the results of the chi-square test. On the willingness to learn the know-how of HPM, professional valuers with a membership of both local and international valuation bodies i.e., AfRES & RICS have significance with the acquisition of the skills and knowledge at 0.004 level of significance. This substantiates the findings of Abidoye, (2017) in Nigeria which concluded that membership with international professional bodies determines professional competence, hence valuation accuracy.

On the willingness to adopt, the membership of both local and international valuation bodies has strong significance with the influence on valuers' readiness to adopt HPM in practice at 0.007 level of significance. This implies that the more professional valuer cooperates with other stakeholders in Tanzania and the international arena, the more eagerness to adopt the HPM in practice. This is coupled with the years of experience in practice which accounts for a 0.006 level of significance because the longer professional valuers' practices, the more they are eager to try new hypotheses and implement them in practice.

Table 3: Chi-square Test

Variables	X^2 value	Degree of freedom (df)	p-value
<i>Willingness to learn HPM know-how</i>			
Highest educational qualification	9.908	12	0.624
Membership with VRB	4.823	8	0.776
Membership in AREPTA, AfRES, and RICS	29.217	12	0.004
Years of experience	24.631	12	0.033
<i>Willingness to adopt HPM</i>			

Highest educational qualification	11.182	12	0.513
Membership with VRB	3.413	8	0.906
Membership of AREPTA, AfRES, and RICS	27.272	12	0.007
Years of experience	25.364	12	0.006

Sources: Authors construct (2023)

The Prospect of Adopting HPM in Practice

This study successfully reported outstanding results on the perception of professional valuers in Tanzania. The argument is, if professional valuers acquire enough knowledge and skills, with the support of empirical studies, the adoption of contemporary valuation techniques will bring about a paradigm shift in the profession. In Table 4 below, professional valuers were asked to rank the benefits of learning the know-how of HPM and adopting the method in practice. It is with the view of the practitioners that, the adoption of contemporary valuation techniques i.e., HPM would transform Tanzania real estate practices with an MS of 4.20 value. The view corroborates with that of Malaysian professional valuers that optimized that the adoption of contemporary valuation practices transformed Malaysian property valuation practices (Abdullah, et al., 2020). Also, the adoption of HPM will be achieved and sustained when implemented and practices came 2nd with an MS of 4.16, and the use of contemporary valuation techniques being able to reduce the subjective interference nature of capturing all the factors during a valuation assignment was the 3rd with an MS of 3.78. This indicates that learning the know-how and adoption of HPM is viewed as significant to the profession, and can be sustained to improve property valuation practices in the country.

Table 4: Benefits of Adopting HPM in Practice

Factors	Level of agreement (%)					Mean score	Standard deviation	Rank
	SD	D	N	A	SA			
The adoption of HPM in Tanzania will add value and transform the valuation practice in Tanzania	2.0	4.0	10.0	40.0	44.0	4.20	.926	1 st
The adoption of HPM in Tanzania will be sustained when implemented and practiced	4.0	4.0	14.0	28.0	50.0	4.16	1.076	2 nd
The use of HPM can reduce subjective interference in property valuation practice	6.0	6.0	28.0	24.0	36.0	3.78	1.183	3 rd
The adoption of HPM will produce reliable estimates that will be acceptable to valuation report end-users and all stakeholders	4.0	16.0	18.0	24.0	38.0	3.76	1.238	4 th

The adoption of HPM is superior to the traditional valuation methods	6.0	12.0	34.0	14.0	34.0	3.58	1.247	5 th
The adoption of HPM can replicate human skills	2.0	16.0	32.0	24.0	26.0	3.56	1.110	6 th
The use of HPM will reduce the costs involved in carrying out valuation exercises	8.0	16.0	34.0	16.0	26.0	3.36	1.258	7 th

Sources: Authors construct (2023)

Conclusion

The current study aimed to evaluate the existing practices on how professional valuers views contemporary valuation practices, specifically HPM in Tanzania. The little awareness of the method and no use of it in practice indicates the need for a spontaneous shift in the profession. With the record of success in Ghana, South Africa, and Nigeria's property market, there is a need for urgent exploration and addressing of this matter in Tanzania which justifies the need for this study and future in-depth analytical studies. In addition, real estate practitioners are less involved in property valuation research, whereas academics affiliated with universities have been the highest contributors to property valuation research in Tanzania. This remark indicates a gap between the theoretical foundation of property valuation against the practices, and this could be one of the reasons for the real estate industry lagging in the adoption of contemporary valuation techniques. This gap must be filled to reduce the valuation inaccuracy and subjectivity nature of property valuation practices.

The main limitation of the current study is driven by the lack of prior studies in Tanzania which could pave the way for modeling and regression of the property price and its attributes. The issue would bring about the testing of traditional hedonic models towards depicting the fundamental link between these attributes and property prices (Hui, et al., 2012). Therefore, future studies, OLS regression, and spatial econometric modeling will be considered.

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Disclosure Statement

No potential conflict of interest was reported by the authors.

Notes on Contributors

Yusuph Iddi holds a bachelor's degree in land management and valuation from Ardhi University, Tanzania. His research interests include real estate valuation, land tenure, sustainable urban development, settlement development, climate science, and youth development. The author is also

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Data Management Practices among South African Construction Professionals: Implications for Industry 4.0 Technologies in Construction Practices

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Abstract

Purpose – This study examined the sources of construction data, the methods of data acquisition and storage, and the factors that influence data management practices among construction professionals in South Africa with a view to establishing their preparedness for Industry 4.0 technologies.

Design/Methodology/Approach - The study sampled the construction professionals registered with the South African Council for the Project and Construction Management Professions (SACPCMP). A closed-ended questionnaire was administered using an online survey tool. The data collected from a total of 134 responses were analysed using mean scores, standard deviations, one-sample t-test, and principal component analysis.

Findings – The results showed that the main sources of construction data are: firms' databases, networking with professional colleagues, and employees' personal records, with mean values of 4.19, 3.51, and 3.40 respectively. Also, findings revealed that data are stored mainly via electronic databases (*mean* = 4.33) and paper/manual records (*mean* = 3.94). The PCA result showed that project characteristics/industry/organizational idiosyncrasies and level of standardization/ICT tools/skills were the major factors influencing data management practices. While these two components have variances of 35.876% and 29.540% respectively, the two cumulatively explained 65.417% of the total variance. The study concluded that data management has become an important part of the construction professional's role

Originality/value – With the increasing integration of Industry 4.0 into construction practices, and the important roles of construction professionals in data sharing and assemblage, the paper highlights the need for conscious efforts toward ensuring good data management practices.

Keywords: Industry 4.0, data sources, construction professionals, automation, data assemblage

1. Introduction

Recent developments and advancements in automation, cyber-physical systems, digitalization, and the Internet of Things (IoT) have triggered a new phase and have redefined human interactions in businesses and exchanges. This new phase has often been referred to as the 4th Industrial Revolution (4thIR) or Industry 4.0 (Villalba-Díez *et al.*, 2020). However, despite the cross-cutting changes, extant studies (RICS Insight, 2018; Ayodele and Kajimo-Shakantu, 2021) have noted that the construction industry seems to lag in terms of the integration of automation and digitalization into its operations and practices. While studies have identified several debacles to

the integration of Industry 4.0 technologies in the construction industry, Tibaut *et al.* (2016) noted that one of such major barriers is the challenge of data, in terms of its interoperability across different stakeholders' platforms. Thus, though the construction sector is data-intensive, the large amount of the data generated during the project life cycle is not adequately utilized (Sepasgozar and Davis, 2018), thereby impacting the level of adoption and integration of Industry 4.0 technologies.

A major driving force for Industry 4.0 is the increased awareness of the need to extract information from data (Ge *et al.*, 2017). Data thus becomes a significant enabler in the transition to Industry 4.0 in the construction industry. Technological tools such as virtual reality, augmented reality, drones, artificial intelligence, robotics, and simulation are gradually transforming the construction industry landscape and these tools are largely displacing traditional methods; thus, leading to an automated/digitalised system that will be largely underpinned by data. Given the increasing interest in data, there is a need for a high level of data integration across the process and operator subsystems, thereby achieving an efficient and effective human and cyber-physical relationship (Kong *et al.*, 2018). Data enables the integration and interactions of the physical and the cyber worlds (Raptis *et al.*, 2019). The foregoing suggests that data is a fundamental resource to advance the cause of Industry 4.0 in the construction industry.

The construction industry generates a large number of important data at different stages of construction projects, which include data related to cost, scheduling, productivity/quality control, safety, visualization, and building information modelling. However, given the need to ensure compatibility and interoperability across different stakeholder platforms, it is essential that construction data are stored in an accessible manner by project stakeholders (Al-Maatouk & Othman, 2018). Among other benefits, ensuring compatibility and interoperability will foster the production of knowledge and allow appropriate decision-making during the construction process.

Extant studies have noted that the ease accessing data is crucial to the success of construction projects and the integration of Industry 4.0 technologies. The assembling of construction data is a significant element in the data management process which affords its users ease of access. However, in practice, the assembling/storing, as well as the retrieval, interoperability, access, and reuse of construction data, appears difficult because the data contained in the different databases of construction firms are mainly unstructured (Yankah & Owiredu, 2016; Martínez-Rojas *et al.*, 2015). This, according to Klaubert *et al.* (2010), is because the actual data from the construction site is not always available in real-time.

The use of automated and digitalized systems has been emphasized as a way of addressing the problem of data management in the construction industry (Egbu *et al.*, 2001; Feng, 2006). However, because of the unique characteristics of the construction industry, which include: one-off projects, low level of technology awareness and training, industry fragmentation, required up-front investment, and resistance to change, the integration and adoption of automation and digitalization have not been optimally embraced in the construction industry (Betts, 1999; Feng, 2006). The ineffective use of digital technologies in the management of data/information could unnecessarily increase the volume of rework during construction projects (Al-Maatouk & Othman, 2018). Although the organising and processing (Ahmad & Nunoo, 1999), quality, and usability

(Bavafa, 2015; Ruddock, 2000) of construction data/information have been looked at in the literature, issues of data assemblage and accessibility remain a great concern among professionals in the construction industry.

Industry 4.0 is largely driven by interconnectivity and real-time data collection and processing across different systems. The data need further creates the challenge of collecting, storing, analyzing, and exploiting data in a valuable way. Poorly managed data could compromise the usability and integrity of the system and limit the integration of Industry 4.0 technologies. While existing studies have examined issues relating to information and data management systems in the construction industry, there is still a gap in the area of the nature of data management practices among construction professionals especially in the global South and the implications of this on the integration of Industry 4.0 technologies in the construction industry. Thus, to ensure an increased adoption and integration of Industry 4.0 technologies in construction practices, there is a need to examine the sources of construction data, the means of data acquisition and storage, as well as factors influencing data management practices among construction stakeholders. Hence, the study seeks to answer the following three research questions:

RQ1. What are the sources of construction data?

RQ2. What are the methods of data acquisition and storage among construction firms?

RQ3. What factors influence data management practices among construction stakeholders?

This paper is organised into five sections. Sequel to the introductory section, section two contains a review of extant studies. Section three provides the research method adopted for the paper. The discussions of findings are presented in section four and the fifth section contains the conclusions.

2. Literature Review

2.1 Construction Data Forms and Sources

The general reluctance of the construction industry to adopt automated and innovative technologies when compared to other industries, such as manufacturing, could be partly triggered by the poor data management practices being employed and stakeholders' apathy towards sharing compatible data across different stakeholders' platforms. While the gains of digitalization and in a broader sense, Industry 4.0 are numerous, the underpinning issue surrounding construction data accessibility sources and forms needs to be given careful consideration (Akinosho *et al.*, 2020)

The construction process involves a vast amount of data which could be in the form of numeric, textual, graphic, multimedia, and other construction information. These are assembled from various sources, which include sensors, experiments, meters, and websites (Bilal *et al.*, 2016). Broadly speaking, construction data can be accessed from two sources: internal and external (Corey *et al.*, 1998; Royal Institution of Chartered Surveyors [RICS], 2019).

In their study on data warehousing, Corey *et al.* (1998) categorised construction data sources into operational sources, which include accounting payroll, company and project finance, cost

estimates, material inventory and equipment, and external sources such as a list of income and demographic information. In the same vein, RICS (2019) categorized the data sources into internal sources, which are property-specific; and external sources, which comprise data on other properties not owned by a particular client. These include financial, economic, socio-economic, political, technical, etc. which inform strategic decision-making.

Internal data are available on the database of firms. On the other hand, external data can be accessed from the database of other firms. These data sources include the database of public institutions, networking with professional colleagues, professional institutions (such as The Association of Schools of Construction of Southern Africa; ASOCSA), clients' databases, print/mass media, construction journals and publications, and government databases (e.g. Statistics South Africa; StatsSA and South African Reserve Bank; SARB). With the advent of the internet, external data is now more readily available than in the past, though it may cost some amount to access some of these databases.

The increasing use of the Internet has led to a large volume of data generated from social media platforms, which could potentially yield valuable business data (Boyd, 2015). Today, social media has become an important tool for improved communication and collaboration among employees in various industries (Azhar *et al.*, 2019) and the construction industry is not left behind. Extant studies have identified emerging trends such as the application of social media data to issues of stakeholder management, health and safety among others.

Data sourcing among construction stakeholders is often expensive, and the traditional methods of data collection are often time-consuming and costly (Tang *et al.*, 2015). The adoption of social media affords the opportunity of overcoming a number of these challenges and extract information in a timely and inexpensive manner (Tang *et al.*, 2017). However, despite these benefits, the use of social media as a source of data within construction organisations has not been optimally employed, perhaps due to some challenges. Azhar *et al.* (2019) noted that some attendant risks and challenges could make construction firms hesitant when considering its implementation.

2.2 Methods of Data Acquisition and Storage

A critical component underpinning the decision support system is the acquisition of accurate and reliable data and the importance of this comes to the fore in decisions relating to the construction process. The acquisition of construction data on and off-site could be through manual or digital methods. The manual method involves the recording and analyzing of data in paper documents. This process takes 30 to 50 per cent of the field supervisory personnel's time (McCullough, 1997) and the data are not always accurate, recent, and adequate (Taneja *et al.*, 2010). Traditional methods of data acquisition employed in the construction sector often pose various problems. The desire for accurate and updated information has seen the emergence of digital technologies which are recently being adopted at different construction phases. Compared to manual methods, digital technology methods have great potential to prevent cost and time overruns and improve project communication among stakeholders. Thus, with increasing technological innovations, the

deployment of electronic data acquisition technologies and wireless technologies has been on the rise in the construction sector (Chen *et al.*, 2022).

Existing studies such as (Oesterreich and Teuteberg, 2016) noted that the performance of the construction industry is significantly hampered by the crude method of transmitting the information. Davila-Delgado *et al.* (2020) stated that the construction industry is fragmented, data-intensive, and project-based, with large amounts of data exchanges and processing requirements during the project's life cycle. The increasing use of the Internet had led to the emergence of big data. These big data could often assist in generating valuable information (Tang *et al.*, 2017). However, given the large size of these data sets and the challenges of storing the vast amount of data, collaboration and seamless communication can be achieved through the use of information control systems, such as cloud computing (Oke *et al.*, 2021).

Available studies on the methods of data acquisition have focused extensively on the tracking of progress, damage detection and safety management, and the location of human and material resources within and outside construction sites. Broadly, the technologies that are relevant in the acquisition of data are classified into four, namely: geospatial technologies (barcoding, ultra-wideband *UWB*, radio frequency identification *RFID*, global positioning system or geographic information system *GPS/GIS*); 3D imaging technologies (photo/videogrammetry, range images, and 3D laser scanning); enhanced IT technologies (e.g., e-mail, multimedia tools, voice-based tools, and handheld computing); and augmented reality (El-Omari & Moselhi, 2009; Omar & Nehdi, 2016). In the category of geospatial technologies, the *RFID* permits the use of tags and a reader which sends radio frequency signals to read data. This technology, according to Song *et al.* (2006) is becoming popular for long-range tracking of the delivery of high-value materials on construction sites. However, poor communication frequency can be an obstacle to long-range tracking in large construction sites (Jog *et al.*, 2011).

The collection of construction data has also been enhanced by the use of digital technologies, which include email, handheld computing, voice-based tools, and multimedia tools. Email is considered to be a highly effective method for tracking, storing, and extracting progress data (Elamin *et al.*, 2009; Hegazy & Abdel-Monem, 2012). Handheld computers and tablets such as smartphones and personal digital assistants (PDAs) (Ghanem, 2007; Tserng *et al.*, 2005) are also used in the construction industry. To record and update site material logs in construction projects, Sunkpho *et al.* (2000) and Tsai *et al.* (2007) utilised voice recognition with the aid of handheld devices. Hegazy *et al.* (2008) noted that the importance of multimedia tools lies in their ability to enable visualization and highlighting of problem areas. Delgado *et al.* (2020) noted that factors limiting the adoption of augmented and virtual reality among construction firms concern the lack of standards for data exchange and issues of data security and ownership

2.3 Factors Influencing Efficient Data Management Practices

Given the increased level of technological development, typified by sensors, network communication, wireless transmission, smart mobile devices and cloud computing, an enormous volume of data is collected across different platforms in increasingly complex structures and forms

(Koseleva and Ropaite, 2017). This necessitates the need for efficient data management practices (Koseleva and Ropaite, 2017). Ayodele and Kajimo-Shakantu (2020) submitted that construction data is often not optimally used due to poor data management practices which manifest through poor and unstandardized methods of data collection. Poor data management practices often impede the use to which data can be put and the level of interoperability/compatibility across different stakeholder platforms. Osunsami *et al.* (2020) highlighted the high cost of data protection and data security as major factors impacting automation and digitalization among construction firms. Akinosho *et al.* (2020) identified data availability, ethics, data privacy and protection as some of the challenges to digitalization in the construction industry. Thus, while digital and automated systems best work with the availability of large data, it appears that stakeholders are still significantly worried about issues of data privacy. Prabhakaran *et al.* (2022) noted the issue of interoperability as one of the challenges confronting the construction industry and impacting the adoption and integration of Industry 4.0 technologies. Interoperability as noted by the authors relates to the ability of the modelling tools to exchange data without undergoing multiple iterations. The need for efficient data management stems from poor data management practices which have been noted as a significant debacle to the increased uptake of Industry 4.0 technology by stakeholders in the construction industry.

Betts (1999) submitted that factors influencing data management practices among construction stakeholders include fragmentation of the construction industry, level of technology awareness, training, and resistance to change. Other factors identified by Barthorpe *et al.* (2003) include the uniqueness of each project, the complexity of the construction process, and industry/firms' practices.

Bilal *et al.* (2016) identified some challenges to the application of big data in the construction industry, one of which is the issue of data quality and the cost implication of acquiring data. Thus, given the large volume of construction data generated and exchanged during the project life cycle, an efficient data management practice becomes an important subject, as the technological advances and innovation being experienced in the construction industry are being propelled on the wheels of efficient data management and sharing among project stakeholders. Efficient data management practices are a prelude to efficient data sharing by stakeholders in the industry. Hence, where data management practices are inefficient and loosely managed, the goal of ensuring increased data-sharing practices among construction stakeholders becomes a mirage. Poor data management practices will hamper the level of data interoperability across different stakeholders' platforms, and lead to increased cost of data assemblage. These will consequently impact the seamless integration of Industry 4.0 technologies. Ayodele and Kajimo-Shakantu (2021) noted that inefficient data management practices, especially in the manner of data production and storage over the life of the project, could significantly impact data-sharing practices among project stakeholders.

The summary of the foregoing showed that data exchanges are central to activities in the construction industry. While extant studies have alluded to poor data-sharing practices among construction firms, it might be expected that most construction firms will prefer data-sharing using electronic data sources. Existing studies suggest that there has been documentation of data sources

and data management practices, there has however been a dearth of evidence from the global South. The South African construction industry is a significant industry on the African continent, thus an examination of data management practices among South African construction professionals becomes germane.

3. Research Method

The study adopted a quantitative research approach, and the target population is construction professionals in South Africa. To achieve national coverage, the closed-ended questionnaire was administered via an online survey tool. Before administering the survey, the questionnaire was pre-tested with two practising construction professionals. While one of the practitioners is both a consultant and an academic with over 5 years of teaching experience, the second is a practising quantity surveyor with over 8 years of professional practice. The suggestions and comments as noted by the practitioners on the initial drafts related to the choice of words and the need for the inclusion of some variables. These comments were duly integrated into the final version of the questionnaire. Having sought and obtained the institutional ethical clearance for the conduct of the survey, the South African Council for the Project and Construction Management Professions (SACPCMP) assisted in sending the survey link via emails to construction professionals on the SACPCMP database. Further follow-up correspondence was done personally through referrals. The survey was administered from March to August 2020. Out of a total of 2,062 professionals reached via emails, only 134 responses were duly filled and found suitable for analysis. This represents 6.50% of the total sample. While studies such as Daikeler *et al.* (2020) have noted that web-based surveys yield lower responses; about 11% lower, when compared to other survey modes, the low response rate could also have been further influenced by the respondents' apathy owing to the aftermath of the COVID-19 pandemic. However, despite these drawbacks, the survey responses could still serve as a representation of the perspectives of construction professionals in South Africa given the size of the participants (134).

In analyzing the respondents' and firms' profiles, the study employed the use of frequency counts and percentages. Regarding the sources of construction data (second section), the respondents were required to rate the frequency of usage of each data source on a 5-point Likert scale ranging from 1 - Never to 5 - Always. The data sources were extracted from the study of Windapo and Qongqo (2011) and modified based on interactions and comments received during the pre-test survey. Issues on data management practices (third section) were examined under three subsections. These are the methods adopted in storing data, the frequency of data updates, and the use of data management systems. These required the respondents to rate the items on a 5-point scale ranging from 1 - Never to 5 - Always. The questions on the factors influencing data management practices were contained in the fourth section. Presented in Table 1 are the factors influencing data management practice as extracted from the literature. These were rated based on the respondent's level of agreement, that is; 1- Strongly Disagree to 5 - Strongly Agree.

The mean scores, standard deviations, and one-sample t-test were analysed for each of the components in the second and third sections. The use of parametric statistical tests is based on the assumption of normality of the data sets being employed. Given that the respondents' ratings are based on a 5-point Likert scale, in the analysis of the one-sample t-test, a test value of 3.0 was

adopted. This was determined using the mid-point of the 5-point scale, i.e., $(1+2+3+4+5)/5 = 3.00$. Hence, mean scores below the test value were regarded as not significant. This approach has been employed by previous studies such as Ayodele and Kajimo-Shakantu (2021). The internal consistency of the factors influencing data management practices was analyzed using the Cronbach alpha test. The result gave an alpha value of 0.902. Given that the alpha value is greater than 0.700, the result shows that the items have an acceptable measure of reliability and consistency (DeVellis, 2012).

Subsequently, the study employed exploratory principal component analysis (PCA) in grouping the factors. The PCA was employed to summarize the data into a few groups representing a combination of original variables so that underlying relationships and patterns can be interpreted and understood. The PCA analysis employed the Varimax rotation method with Kaiser normalisation in grouping the factors into components/clusters of the original variable. For each factor and component, the study also analysed the mean scores and standard deviations.

Table 1. Factors Influencing Data Management Practice

Factors	Sources
Level of complexity of each project	Barthorpe <i>et al.</i> (2003)
Relative uniqueness of each project	Barthorpe <i>et al.</i> (2003)
Number of project stakeholders	RICS Insight (2018)
Fragmented Nature of the Construction Industry	Betts (1999)
Organizational culture and practices	Betts (1999); Barthorpe <i>et al.</i> (2003); Che-Ibrahim <i>et al.</i> (2019)
Level of coordination among project stakeholders	Pamulu (2004)
Means of communication among project stakeholders	RICS Insight (2019)
Project lifecycle	Sarkar and Thakkar (2018); Al-Maatouk and Othman (2018)
Level of standardization in documents and data	Ruddock (2000); Ahuja (2009); RICS Insight (2019)
Availability of required software	Pamulu (2004)
Level of ICT knowledge and skills	Betts (1999); RICS Insight (2018)

4. Findings and Discussion

4.1 Profile of the Respondents

As presented in Table 2, an examination of the respondents' roles in the construction firms showed that the majority (38.10%) were construction/project managers. Also, 21.6% were Quantity Surveyors, 10.4% and 11.2% were Engineers and Builders respectively. Architects and Estate/Facility managers accounted for 3.7% and 8.2% respectively. The responses regarding the academic qualifications of the respondents showed that 49.3% had Honours, while 20.9% and 6.0% had Master's and PhD degrees respectively, and a total of 11.2% had Matric. The years of experience of the respondents in the construction industry revealed that while 42.5% have had above 20 years of working experience in the construction industry, only 11.9% have spent 5 years and below. A total of 17.9% and 17.2% have had 6 to 10 years and 11 to 15 years of work experience respectively. The responses about the respondents' cadre showed that 14.9% were low-level employees, 25.4% and 19.4% were mid and senior-level employees respectively. A total of 40.3% of the respondents were firm executives.

Analysis in Table 2 further showed that the firm's size ranged from a small firm (23.9%) to micro and medium-sized, these accounted for 10.4% and 38.8% respectively. Large and multinational firms accounted for 19.4% and 6.7% respectively. The years of organizational establishment showed that 67.2% of the firms have been in existence for over 15 years, and only 9.7% of the firms were established 5 years below. A total of 14.9% and 8.2% of the firms were established between 6 to 10 years and 11 to 15 years respectively.

The foregoing suggests that the respondents were from across a variety of built environment professions and have had significant years of experience in the construction industry. Also, given the academic background and management cadre of the respondents, it is expected that they would give well-suited responses to issues of data management practices in the firms and the construction industry at large. The profile of the firms also suggests that most of the firms have been in existence for over 6 years cutting across small, micro, and multinational construction firms.

Table 2. Respondents and Firms' Demographics

Profiles		Frequency	Percentage	
Respondents Role	Architect	5	3.7	
	Builder	15	11.2	
	Engineer	14	10.4	
	Construction/Project Manager	51	38.1	
	Quantity Surveyor	29	21.6	
	Estate/Facility Manager	11	8.2	
	Others	8	6.0	
	No Response	1	0.7	
	<i>Total</i>	<i>134</i>	<i>100.0</i>	
Academic Qualifications	Matric	15	11.2	
	Honours	66	49.3	
	MSc	28	20.9	
	PhD	8	6.0	
	Others	17	12.7	
	<i>Total</i>	<i>134</i>	<i>100.0</i>	
	Years of experience in the Construction Industry	5 years and below	16	11.9
6 to 10 years		24	17.9	
11 to 15 years		23	17.2	
16 to 20 years		10	7.5	
above 20 years		57	42.5	
No Response		4	3.0	
<i>Total</i>		<i>134</i>	<i>100.0</i>	
Management cadre	Lower Level	20	14.9	
	Middle Level	34	25.4	
	Senior Level	26	19.4	
	Executive	54	40.3	
	<i>Total</i>	<i>134</i>	<i>100.0</i>	
Firms Profile	Size of firm	Small Firm	32	23.9
		Micro	14	10.4
		Medium Sized	52	38.8
		Large	26	19.4
		Multinational	9	6.7
		No Response	1	0.7
		<i>Total</i>	<i>134</i>	<i>100.0</i>

Years of organizations' existence			
	5 years and below	13	9.7
	6 to 10 years	20	14.9
	11 to 15 years	11	8.2
	above 15 years	90	67.2
	<i>Total</i>	<i>134</i>	<i>100.0</i>

4.2 Sources of Construction Data

The results of the sources of construction data as presented in Table 3 show that the major sources of construction data are firms' databases and networking with professional colleagues and employees' personal records. These have mean values of 4.19, 3.51, and 3.40 respectively. They are also statistically significant at $p < 0.000$. The least rated sources of construction data by the firms include print and mass media ($mean = 2.92$; $p = 0.477$), and other firms' databases ($mean = 2.57$; $p = 0.000$). These have negative mean differences of -0.08 and -0.43 respectively. Other sources with statistically significant mean values at $p < 0.05$ are government databases ($mean = 3.27$; $p = 0.018$) and databases of public institutions ($mean = 3.26$; $p = 0.005$). The result suggests that while firms rely significantly on their databases, professional networking among professional colleagues still serves as a major source of obtaining construction data by the construction firms.

A major finding from the result also suggests that there is less collaboration among construction firms regarding data sharing, as this was rated the least among the sources of construction data. The firms thus rely more on internal data sources as opposed to external data sources. This affirms the *a-priori* expectation that firms will make more use of internal data sources as opposed to external sources from other construction firms.

Table 3. Sources of Construction Data

Sources of Construction Data	Descriptive Analysis		One-Sample Test (Test Value = 3.0)		
	Mean	Std. Dev.	t	p-value	Mean Diff.
Construction firm's database	4.19	1.056	13.006	0.000	1.19
Networking with professional colleagues	3.51	1.026	5.708	0.000	0.51
Employees personal records	3.40	1.114	4.125	0.000	0.40
Government databases	3.27	1.298	2.406	0.018	0.27
Database of public institutions	3.26	1.065	2.849	0.005	0.26
Clients' personal records	3.13	1.151	1.281	0.202	0.13
Construction journals and publications	3.05	1.134	0.459	0.647	0.05
Professional Institutions	3.00	1.236	0.000	1.000	0.00
Print/Mass media	2.92	1.216	-0.713	0.477	-0.08
Other firms' database	2.57	1.110	-4.454	0.000	-0.43

4.3 Analysis of Data Management Practices

The study examined the data management practices of construction firms. This was assessed under three sub-sections, the first examined the methods adopted by the firms in storing construction data, the second and third assessed the frequency of construction data update by the firms, and the use of data management systems by the construction firms respectively.

An examination of the method of data storage by the firms as presented in Table 4 showed that the firm's electronic database (*mean* = 4.33) was more highly rated than other means of data storage. The least rated mediums of data storage are public databases (*mean* = 3.24), and employees' manual records (*mean* = 3.19). These results were further analysed for statistical significance using the one-sample t-test at a test value of 3.00. The result showed that the statistically significant responses are firms' electronic database ($p = 0.000$), firms' manual records ($p = 0.000$), employees' electronic database ($p = 0.000$), and public database ($p = 0.048$). Employees' manual records were not statistically significant. This had a p -value of 0.088.

Analysis of the frequency in which the construction data were updated showed that the most adopted means of the update was project-based. This had a mean value of 4.19, significant at $p < 0.05$. Time-based updates had a mean value of 3.20 and a non-significant p -value of 0.102. The update of data based on projects might be influenced by the frequency of project completion. Hence, construction firms rely largely on in-house construction data, generated from their own projects to update their database.

The responses on the use of data management systems showed that data management systems were largely used by construction firms. This had a mean score of 3.57, a positive mean difference of 0.575, and a significant p -value of 0.000. The result suggests that where management systems are employed by the firms, the ease of data sharing could be ensured and the challenges of interoperability and compatibility are gradually surmounted.

Summarily, the results show that electronic data storage was mostly adopted. Specifically, one of the proven benefits of using electronic storage, especially the cloud, is the safety of the file even when the hardware components are damaged. Past studies which include Tserng *et al.* (2005), Ghanem (2007), Elamin *et al.* (2009), and Hegazy and Abdel-Monem (2012) have also revealed that electronic storage such as email and handheld computers are increasingly embraced by construction firms. The frequency of the construction data based on the available projects is an indication of the peculiarities that make one project different from the other. Contrary to Ayodele and Kajimo-Shakantu's (2020) submission that construction data is often not optimally used due to poor data management practices, the result showed that firms employ data management systems in the storage and retrieval of construction data. There seems to be an increased level of data sharing among construction professionals in the construction industry due probably to the COVID-19 pandemic. Based on Ahuja's (2009) submission that construction data are still exchanged via conventional human interactions and hard copy documents, the level of satisfaction with the data sharing could be a case for further investigation.

Table 4. Data Management Practices

Data Management Practices	Descriptive Analysis		One-Sample Test (Test Value = 3.0)		
	Mean	Std. Dev.	t	p-value	Mean Diff.
Method adopted in Storing Construction Data					
Firm's electronic database	4.33	0.927	16.556	.000	1.331
Firm' paper/manual records	3.94	1.047	10.311	.000	0.939
Employees electronic records	3.82	1.248	7.519	.000	0.823
Public database	3.24	1.358	1.995	.048	0.237
Employees manual records	3.19	1.276	1.718	.088	0.192

Frequency of Construction Data Update					
Project-based	4.19	1.009	13.514	.000	1.191
Time-based	3.20	1.372	1.649	.102	0.205
Use of Data Management Systems					
Use of data management systems	3.57	0.992	6.709	.000	0.575

4.4 Factors Influencing Data Management Practices

Having examined the data management practices, the study analysed the factors influencing data management practices among construction firms, using principal component analysis (PCA). The preliminary analysis, examining the factorability of the constructs based on the KMO and Bartlett's test of sphericity gave a KMO value of 0.847, significant at $p = 0.000$. This shows that the data set is adequate and satisfies the criteria for factorability.

Having met the condition for factorability, a two-factor solution was arrived at given the examination of the scree plot (Figure 1) and also the interpretability of the factor loadings under each component. The outputs, as presented in Table 5 (total variance explained table), show that the items converge under two components. These two components represent 65.417 of the percentage cumulative variance. While the first component accounted for 35.867%, the second component accounted for 29.540 of the total variance.

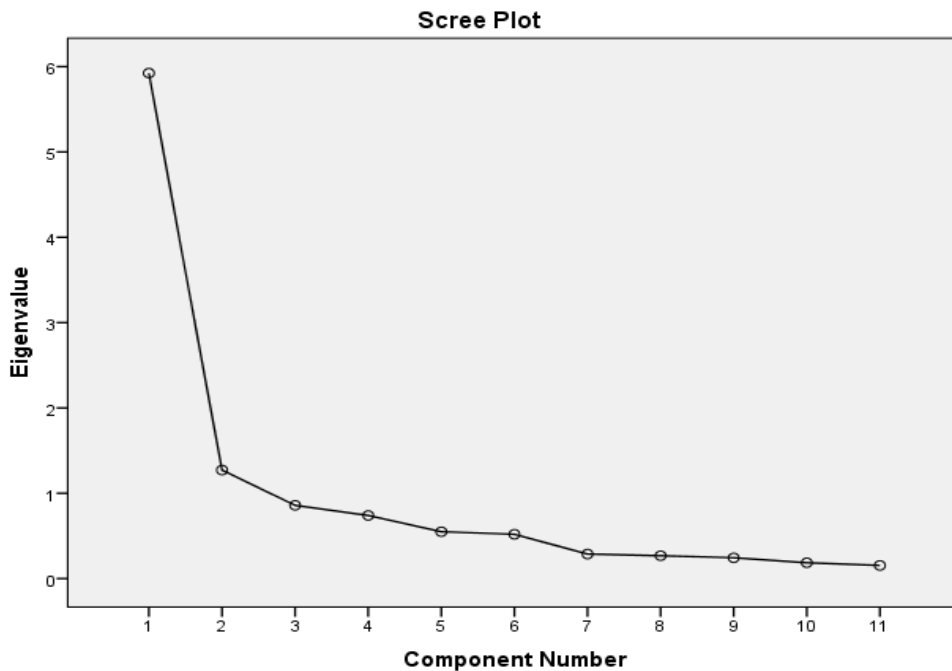


Figure 1. Scree Plot of factor extraction

Table 5. Total Variance Explained Table

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.924	53.855	53.855	5.924	53.855	53.855	3.946	35.876	35.876
2	1.272	11.562	65.417	1.272	11.562	65.417	3.249	29.540	65.417
3	.858	7.804	73.220						
4	.740	6.723	79.944						

Extraction Method: Principal Component Analysis

Table 6 (rotated component matrix) presents the factor loadings, extraction, Cronbach alpha, and the mean and standard deviation values of the factors. The first component is termed Project Characteristics and Industry/Organizational Idiosyncrasies, while the second component is termed Level of Standardization and ICT Tools/Skills. An examination of the first component showed that factors loaded under it are the level of complexity of each project, relative uniqueness of each project, number of project stakeholders, fragmented nature of the construction industry, organizational culture and practices, level of coordination among project stakeholders, means of communication among project stakeholders, project lifecycle.

Extant studies such as Che-Ibrahim *et al.* (2019) and Ahmed *et al.* (2018) have highlighted that one of the major factors influencing the level of data sharing is organisational culture and practices. Most often multinationals and large construction companies usually are reluctant towards data sharing, as opposed to smaller construction companies. This owes to the access to data enjoyed by large companies. Hence, efforts at ensuring data-sharing practices may not be encouraged by larger firms given their access to data and perceived market dominance. Based on the level of complexity and the uniqueness of construction projects, firms form a short-term contractual alliance, which is terminated upon completion of the project. Depending on the number of project stakeholders and the nature of the contractual term, this could pose a challenge to data sharing, due to the project participants' inability to share and keep project data, such data could be lost (Zhang and Fai-Ng, 2012). Also, gathering data in an ad hoc manner, different means of recording, availability of data management tools, lack of clearly defined roles for the project participants and varying levels of experiences by project participants, could pose a barrier to data sharing an assemblage among construction firms (Von-Tran and Kanjanabootra, 2013).

Factors loaded under the second component are the level of standardization in documents and data, availability of required software, and level of ICT knowledge and skills. Though a large volume of data is generated during projects, however, the inconsistent means through which the data is produced and shared often lead to issues of interoperability. This brings to the fore the challenge of data interoperability and the level of ICT knowledge and skills. Data collated during construction projects are often incompatible with other databases, owing to the lack of standardized methods of data assemblage. Incompatible and interoperable data sets undermine the usefulness of data among construction firms.

Nassar (2007) noted that the lack of data standardization and the unstructured mode of data storage pose significant challenges to data sharing in the construction industry. Lack of standardization is often a result of the fragmented and silo operations for which the construction industry is known. The challenge of unstructured data, the unstandardized method of data gathering, other issues of interoperability and the bias by construction firms towards data will adversely impact the level to which digital and innovative technologies can be integrated into construction activities.

Table 6. Rotated Component Matrix

Components/Factors	Factor		Cronbach Alpha	Mean	Std. Dev.
	Loadings	Extraction			
1. Project Characteristics and Industry/Organizational Idiosyncrasies					
Level of complexity of each project	.882	.780	0.888	3.87	0.979
Relative uniqueness of each project	.855	.751		3.81	0.901
Number of project stakeholders	.703	.681		3.70	1.072
Fragmented Nature of the Construction Industry	.674	.561		3.66	1.018
Organizational culture and practices	.669	.685		3.73	1.043
Level of coordination among project stakeholders	.618	.555		3.60	1.051
Means of communication among project stakeholders	.566	.633		3.70	1.060
Project lifecycle	.444	.346		3.62	1.096
<i>Component Aggregate Mean</i>				3.71	0.798
2. Level of Standardization and ICT Tools/Skills					
Level of standardization in documents and data	.870	.788	0.841	4.03	0.974
Availability of required software	.850	.789		3.68	1.127
Level of ICT knowledge and skills	.761	.626		3.68	0.991
<i>Component Aggregate Mean</i>				3.79	0.898

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

An examination of the reliability of the two components using the Cronbach alpha test showed that the first, with 8 factors, had an alpha value of 0.888, while the second component, with 3 factors, had a Cronbach alpha value of 0.841. These Cronbach alpha values suggest a good measure of internal consistency and reliability among the constructs making up the two components. An examination of the mean scores of each component shows that the first component had an aggregated mean score of 3.71, while the second component had an average mean score of 3.79. An item-by-item analysis of the factors under each component showed that concerning items under the first component, the level of project complexity (*mean* = 3.87) and relative uniqueness of each project (*mean* = 3.81) were factors having the highest mean values. Items with the least mean scores are the level of coordination among project stakeholders and the project lifecycle. These had mean values of 3.60 and 3.62 respectively. Regarding the second component, the Level of standardization in documents and data had the highest mean score of 4.03. This is followed by the level of ICT knowledge and skills (*mean* = 3.68) and availability of required software (*mean* = 3.68).

An examination of the standard deviation values suggests that the first component, Project Characteristics and Industry/Organizational Idiosyncrasies, had a lower standard deviation value of 0.798, compared with 0.898 for the second component: Level of Standardization and ICT Tools/Skills. This suggests that there is a lower level of divergence by the respondents in terms of

the influence of Project Characteristics and Industry/Organizational Idiosyncrasies on data sharing among construction stakeholders.

The influence of project characteristics and organizational culture on data assemblage and management corroborates extant studies such as *Barthorpe et al.* (2003) and Betts (1999). These findings underscore the need for organizational culture and industry practices that encourage efficient data management systems that will engender seamless data-sharing practices among construction stakeholders. In addition, studies such as Ahuja (2009) and Ayodele and Kajimo-Shakantu (2020) have highlighted the implications of data standardization and the use of digital tools in enhancing data-sharing practices. Where vast amounts of unstructured data are generated during the construction process and stored manually, the goal of data standardization and assemblage becomes a mirage, thereby making data sharing among different stakeholder platforms a difficult task.

5. Conclusion

The findings of this study have implications for construction stakeholders. For the construction industry to fully benefit from the gains of Industry 4.0, construction firms must begin to embrace efficient data sharing and assemblage practices. The study also concludes on the need to re-orientate construction professionals with respect to timely and accurate data as well as sharing of the same across compatible platforms. The increased synergy between firms and other construction stakeholders concerning data sharing and assemblage should also be encouraged. The findings from the study can serve as a basis to stimulate stakeholders to cut back on silo thinking and fragmentation and encourage data sharing and assemblage. This will enhance the productivity of the construction industry and encourage seamless and optimal integration of Industry 4.0 technologies in the construction practice.

The paper implies that data management is becoming an important part of the construction professional's role and as such, conscious efforts must be geared toward ensuring good data management practices. Some initiatives that could enhance increased data-sharing practices among construction firms include: building up appropriate internal competencies to mitigate the challenge of knowledge and required skills; enlightenment of construction stakeholders about the benefits of data sharing and the centrality of data to the increased uptake of industry 4.0 technologies is required; and an understanding of organizational and legal challenges towards data sharing, which will assist in providing insights into the challenge of data sharing in the construction industry. If the gains of digitalization and automation are to be fully harnessed by leveraging industry 4.0 technologies, stakeholders must begin to remove individual and organizational practices that serve as barriers to the full implementation of efficient data management and assemblage in the construction industry. The authors hope that this study will create greater awareness among construction stakeholders on the need for efficient data management systems to drive the wheels of Industry 4.0 in the construction industry.

Despite the insights afforded by the study, the limitations of this study are also appreciated. Further studies could explore the level of adoption of Industry 4.0 technologies among construction

stakeholders. The barriers to the uptake of digital data management practices impacting industry 4.0 technologies among stakeholders could also be explored.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Notes on Contributors

Dr. Ayodele is a well-published researcher with over 40 research articles in international journals and refereed conferences across Africa, America, and Europe. With a particular focus on emerging markets, his researches have largely revolved around Property Investment and Finance, Data Management Practice/Fourth Industrial Revolution, Sustainability and Real Estate Education.

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**Peer Reviewed*

An Evaluation of Shortfalls in Managing Public Urban Lands in Developing Countries: A study of Burundi

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Abstract

Public urban land management has been a challenge in developing countries despite efforts engaged by governments and development partners. Taking Burundi's case study, this paper identified shortfalls observed in public urban land management for developing countries. A qualitative research approach in data collection and analysis was applied. The desk review of different reports and policy documents was used and interviews with local leaders and influential people were conducted in the case study to collect participants' views and perceptions. Furthermore, a Key Informants Interview (KII) with high-rank authorities was prepared to confirm the interview and desk review findings. Then, data were analysed through the content analysis technique. The findings revealed that four shortfalls in public urban lands management include the legacies of colonialism in ownership of and access to land and politicisation of land management; the existence of a hidden hand in all land deals; laissez-faire in land management by top leaders to create a chaotic situation in land management; and lack of partnership between public and private partners in land management. The paper recommends that the Government of Burundi collaborate with stakeholders to afford the application of new approaches and technologies in public urban lands management.

Keywords: Burundi; Developing countries; Land; Land management; Public urban lands

1. Introduction

Effective land management is recognised as the only way to overcome some land-related challenges in developing countries. Enemark (2006, p.13) defines land management as ‘the process whereby land resources are put to good effect’. ‘Good effects’ in achieving sustainable development (Barry, 2018; Dawidowicz & Żróbek, 2017); improving community well-being (Fligg & Robinson, 2020); and attaining sustainable urban development (Adigeh & Dagne, 2020; Bondarev et al., 2019). These are some of the positive sides of effective land management for the country if land management projects are implemented. But what is mostly observed in some developing countries are systems that seem to manage land for the public interests but with a kind of hidden agenda

The land sector in developing countries has been among the corrupted sectors and a conflict borne coupled with the interference of politics and elitism (Olima, 1998). The emergence of new

approaches that came to establish effective land administration systems such as the Participatory approach in land administration (Salter et al., 2010), pro-poor land administration (UN-Habitat, 200; and Hendriks et al., 2019), and the famous Fit-For-Purpose (FFP) approach that is being sensitized to be implemented in most of developing countries (Musinguzi & Enemark, 2019; Sudarman et al., 2019) are piloted or tested, but no positive results are observed in the land sector. Furthermore, land management has known new technologies, and Digital Applications for land-related problems are addressed (World Bank, 2017; Chukwuma, 2021). However, how far some developing countries like Burundi have used these approaches and technologies to manage public urban lands is not documented. Therefore, this paper documents the shortfall affecting ineffective public urban lands management in the highly urbanising city of Bujumbura despite the existence of institutional legal frameworks coupled with the application of new technologies and digital applications in land management. A desk review complemented with a Key Informant Interview is applied to generate information used to achieve the aforementioned objective. The purpose is to identify these shortfalls and communicate them to decision-makers in land-related sectors to work on them to establish effective land management in their countries.

2. The conceptual framework of public urban lands management

The concept of land management, in general, emerged from the proper use of land so that land degradation and land resource depletion can be addressed. Whereas in rural areas the concept of land management is well known for addressing problems related to hunger, nutrition, and land degradation (Radstake, 2017); in urban areas, land management has the objective of effectively administering land for housing improvement (Jenkins, 2015); combat urban poverty by availing land to the poor (Olima, 1998); attain planned urban growth and development in all aspects (Hansson et al., 2019; Vargas-Hernández & Zdunek-Wielgołaska, 2019); and afford a sustainable built environment landscape (Olima, 1998). More than another thing, land management in urban areas is needed especially for public urban lands.

Land management is a process of achieving proper land use that can lead to sustainable development (Enemark, 2006). Argued by experts in the land sector that land administration is put in front of all other initiatives to operationalise land management and effective land administration leads to proper land management is conditional on establishing strong legal and institutional frameworks (Burns, 2007; Enemark, Bell, et al., 2014). However, these legal frameworks that are

in one way or another formulated and adopted by politicians and powerful people are still doubtful in achieving sustainable land management. Some authors have shown how the interference of politically and economically powerful people in land management has used this legal and institutional framework in grabbing and swapping in their case studies (Batterbury & Ndi, 2018; Bae, 2019). Foreigners who came to invest in Africa have even considered African land as ‘for sale’, seeing it as cheap or even free, and land as empty (Hall, 2011). This conception has encouraged foreigners and local powerful people to participate in massive land acquisitions under the umbrella of local investment.

In Kenya, Olima (1998) has for decades pointed out how land acquisition by powerful people (local elites and foreigners) is informally and or formally accessing land despite the land policy and other regulations that prohibit large land acquisition in public holdings. The same in Ethiopia and Ghana, the rush for land is observed and done by economically and politically powerful people (Rafiee & Stenberg, 2018). Local communities and civil societies (where exist) have vividly contested the practice without success (Ndi, 2017). The way land is managed is as if there are no policies and institutions that are in place to effectively manage land. However, legal and institutional frameworks are there and sometimes contribute largely to worsening the situation (Awuah & Abdulai, 2022) . The observed results in Burundi for example show that the existence of legal and institutional frameworks does not respond to challenges related to land management, but rather, creates further challenges to land rights and gender equality in land access and acquisition. However, there a cases where the existing institutional framework causes problems that include power overlap and chaos in land management (Clement & Amezaga, 2013; Obaikol, 2014). This is contrary to developed countries. The existence of a legal and institutional framework supports the decentralisation of services in the land sector; used to win the battle against corruption up to zero cases of corruption and nepotism in the land sector; and afford to equip and train local land officers in land management (Williamson, et al., 2010). Strong legal and institutional frameworks are cited to be the foundations of acceptable transformations and orientations in land deals (UNECE, 2005). The idea is that these frameworks smoothen the introduction of new approaches and technologies applied in revolutionising land administration systems to achieve effective land management.

The pro-poor approach was appreciated as a tool that is a locally practicable, integrative, implementable, and scalable alternative approach to participatory in promoting land rights and improving access to land (Hendriks, et al., 2019). With its definition by UN-Habitat (2007) to be an approach that considers widely the poor people's needs, in urban areas, the approach was recommended as a tool that will help to tackle the informal settlement by providing safer lands and avoiding eviction as well as shanty resettlement (UN-Habitat, 2004). The approach is built on involving local leaders and landowners in the process of land management and is coordinated to solve recurrent problems that involve the majority of society. However, the results were not as envisaged. In urban areas, accessing land legally, including and integrating poor people in the planning process is important, but not easy to afford. The approach works easily with conventional land administration systems, allowing experiences and best practices to be integrated into the approach (Hendriks et al., 2013). The authors noticed that the approach involves civil societies and researchers as well as working in customary, informal, and post-crisis settings. However, it is not easy to apply in all countries. The existing land administration system is still weak and poor in managing land, especially public urban lands that everyone needs to access. UN-Habitat (2007) disclosed that political and technical issues affect negatively results and need a thorough analysis in some contexts. Still, considering the aforementioned critics, we suggest that the approach cannot be taken as a blueprint tool in land management. Yet, we can maintain the important part of it and be associated with other approaches. Further, fit-for-purpose which is people, process, and technology-centered was developed to cater to the needs of countries to achieve effective land management.

The fit-for-purpose approach is applied in many countries that want to embark on systematic land registration programs. The approach was appreciated to meet the needs of people, especially the poor and vulnerable group of people who are challenged with enjoying the bundle of rights. Supporting land tenure security for tenure for all and managing land use and natural resources sustainably, Enemark et al. (2014) mentioned these attributes as the positive characteristics of the FFP approach. The FFP is considered a 'game-changer' in land management since it is affordable and sustainable. Specifically, the approach is built on flexibility in the process, inclusivity in participants, participation at all levels, affordability in cost, reliability in results, attainability in time, and upgradability in technology (Barry, 2018; Sudarman et al., 2019).

Countries like Rwanda, Ethiopia, Kenya, Uganda, and Ghana are referred to as best practice cases in revising their legal and institutional frameworks as well as spatial frameworks before embarking on the fit-for-purpose approach. For example, Ali et al. (2010) showed how the Government of Rwanda systematically started by formulating a new policy and other land-related regulations, followed by establishing land governance institutions; then developing strategies and testing them, and finally implementing these strategies at the national level to reach exemplary Rwanda's land reform. The process was almost the same in the other countries above-cited except that the results are different due to the country's context. Recently, Mozambique and Uganda cases have reportedly affirmed and confirmed the effectiveness of this approach in massive land registration. It is pointed out by Balas et al. (2021) that 5 million parcels were registered and 4000 communities delimited within a short time and low cost. In Uganda, the approach envisages registering properties through unconventional approaches that are time and cost-saving (Musinguzi & Enemark, 2019). The approach is attributed to determining general boundaries rather than fixed ones. To achieve these, aerial imageries are preferred against cumbersome field surveys. It is learned that accuracy is related to the purpose rather than to the technical standards; and allows the opportunities to update, upgrade, and improve after the process (Enemark, et al., 2014; Sudarman et al., 2019). Furthermore, those who used this approach agree that it fits within many developing countries' contexts given that they use affordable technologies in building spatial infrastructure and apply a participatory approach in the whole process.

The FFP is known to apply affordable technologies in constructing the spatial framework and data gathering and processing. But we do not share the same opinion. Some countries cannot afford the so-called 'affordable technology'. For example, the use of Unmanned Aerial Vehicles (UAVs) also known as drones considered 'a viable technology' useful to acquire aerial images (Chukwuma, 2021; Stöcker et al., 2022); application of mobiles phones to support the delivery of land administration services (Stokke, 2019) and other technologies are not easy to stock up by most of developing countries. Even the list of technologies suggested by the World Bank (World Bank, 2017) is not easy to afford for some developing countries. Therefore, governments in developing countries find themselves forced to depend on foreign aid, NGOs, and CBOs which in some cases land management is not their area of intervention.

In general, the empirical data show that the approach is successfully implemented in countries that are politically, economically, and socially stable and see systematic land registration as a way of catching up with developed countries. Land administration is also subscribed to the implementation of Global Agenda and politics such as Sustainable Development Goals and New Urban Agenda consecutively. Figure 1 summarises the conceptual framework on components that should constitute active land management in a holistic way and public urban lands in particular. The figure shows that effective land management should be operationalised through legal and institutional frameworks.

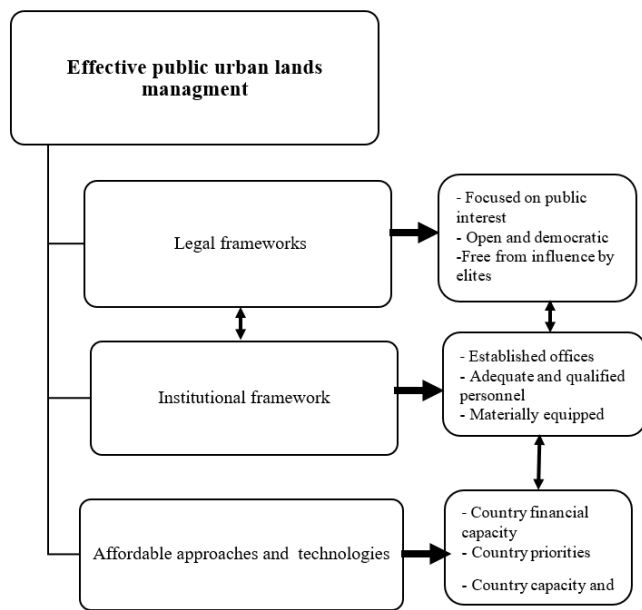


Figure 1: Conceptual Framework of effective public urban lands management

Source: Author’s construct based on the literature review (2022)

3. Research Material and methods

This research applied a qualitative research approach with a case study method. Applying qualitative research is known as the best way to understand, interpret, and in some cases contextualise the perspectives of actions (Macdonald & Headlam, 2008); and the use of case study comes to harness the arguments since it is subscribed to qualitative methodology (Rebolj, 2013). Other authors like Sturman (1997) and Simons (2009) showed at different times how the case study approach helps to comprehensively and thoroughly describe the case and analyse it. The paper described the management of public urban lands in Bujumbura as a highly urbanising city.

To successfully undertake the research, qualitative data were required and collected by using different data collection methods and tools. Information on legal and institutional frameworks, as well as private actors involved in public urban management, are collected through a desk review. In this research, this technique helped to identify and summarise some articles of legal texts that support the management of public urban lands. Further, the so-far achievements and ongoing activities performed by responsible institutions in land management are shown. This consisted of a thorough reading of recent annual reports for 2015-2021 provided by the land Management office, cadastre office, Urban Planning office NGOs, and Local Associations. Also, government policy documents such as the Land Code of 2011; Land Policy of 2010, Urbanism, Housing and Construction Code, Bujumbura Master Plan 2018 -2043, and Burundi National Plan 2018-2027 have been consulted to gather information about legal frameworks.

Moreover, this paper used the interview technique to gather information from key informants, local leaders, and civil community leaders in Bujumbura City. For key informants' participants, an unstructured interview was applied. Participants were selected through simple purposive sampling procedures. This technique is described by Bryman (2012) to be a strategic technique for selecting useful participants who can deliver needed information about the research objective or question. Therefore, 12 participants were selected purposely and included two officers from the Land Management Office, two from the Urban Planning and Management Office, two from the office of OBUHA¹, four from LADEC, GIZ, and ZOA, and two from the office of Cadastre, and Land Title. These participants helped to map the institutions that are in place to manage land in Bujumbura; and to cite and describe the approaches and technologies used to manage public urban lands. The unstructured interview was also used by local leaders and community leaders to confirm the results from the officers at the city council level. The two techniques helped to collect data that covered the legal and institutional framework, approaches, and technologies used to manage public urban lands. The data were analysed through content analysis. Bryman (2012,p. 289) defined content analysis as 'an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and a systematic and replicable manner. The author attributes content analysis to be transparent, permitting longitudinal analysis, unobstructed, with less level of ethical scrutiny, high level of flexibility, and allows the generation of information

¹ Burundi Office for Urban Planning and Housing Development

from social settings more easily than other methods. It has to be noted that the content analysis can be done in a descriptive approach, inferential, predictive, and psychometric (Neuendorf, 2002). All these types of content analysis are valid but, the descriptive approach is selected for this research. It allows the researcher to make conclusions from many texts recorded or read from documents. The information is presented in text and table format to assure readability and presentability.

4. Results and discussion

4.1 Pre-colonial Era and land management in Burundi

The existing literature does not give details on written policies or decrees formulated in the pre-colonial era, but some books acknowledge that traditional arrangements in land management existed. The King and its notables were the custodians of the land for the Burundian people. Access and other rights were reserved for the individual whereas communal holding remained the center of the land tenure system.

4.2 Colonial Era and land management in Burundi

The colonial era is subdivided into two periods according to occupations and world supremacy. Burundi was first colonised by Germans from 1890 -1916 when it was defeated in the First World War, and by Belgium from 1916-1962. The land issues were handled differently.

- **Burundi under German Occupation:** During the occupation, Germans were not significantly involved in changing the land tenure system. However, it has the power to transfer land to missionaries through selling, allocation, and land gratis. The missionaries were the most beneficial of land transfer by Germans.
- **Burundi under Belgium occupation:** In 1916-1962, Burundi was annexed to Congo-Belgium colonies to properly control and exploit the Congo's natural resources. Burundi and Rwanda had the potential for human resources to be mobilised in eastern mining site exploitation. During Belgium's occupation, many decrees and land laws were imposed on the Ruanda-Urundi land tenure system to properly grab and swap land from natives. Normally, no new laws and decrees were adopted for Ruanda-Urundi, but the execution of

previous land laws was formulated for Congo-Belgium. Despite the human resource that was targeted when Belgium requested Ruanda-Urundi to be annexed to its colony, land has been the second target in Burundi due to its fertility and location (along Tanganyika Lake). In a few words, the colonial period had nothing to boast about in land management for Burundians except that land was taken from natives and attributed to missionaries. The actual situation shows that the Roman Catholic Church, Anglican, and Pentecost churches hold larger lands in urban and rural areas than other Government institutions.

4.3 Burundi and land management from 1962 to 2000

The post-independence period was characterised by many civil wars based on ethnic and regional supremacy. Many Burundians specifically Hutus had fled the country at different times. Their land was nationalised or acquired in fraudulent arrangements by individuals. Therefore, legal texts adopted during this period were to legalise these types of land acquisitions to discourage those who fled not to think about coming back. If returned, they could not reclaim their properties.

4.4 Legal texts for land management from the Arusha Peace Agreement of 2000 up to date

The 2000s period marked the process of ending the decade of civil war through negotiations. The Arusha Accord² signed in 2000 is a starting point of other legal texts that were adopted to deal with political, social, and economic problems in Burundi. The formulated and amended land-related legal texts took reference and orientations in this document (Government of the Republic of Burundi, 2000). These legal texts include the Constitution of Burundi of 2005 amended in 2018. As mother-law in management of public affairs in Burundi, Art.36 &69 are concerned with property ownership and property rights land as a fundamental right to Burundians; and all Burundians are obliged to protect publicly owned properties (Government of Republic of Burundi, 2018). Other legal texts related to land management followed include the National Land Policy of Burundi of 2008, the Land Code of 2011, the National Forestry Policy of Burundi (2012), the Forest Code of Burundi of 2016, the Mining Burundi Code of 2013, the Burundi Water Code of 2012, Burundi Environment Code of 2000 (modified in 2021), Code of Urban Planning, Housing

² The protocol IV on Reconstruction and Development, Chap. I, Art.8 deals with issues related to land and other properties.

and Construction in Burundi of 2016, and law N0.1/10 of May 2011 on the creation and management of protected areas in Burundi are all related in one way or another on Land management. The following chart summarises the legal land-related frameworks adopted to manage land in Burundi from the colonial era up to this date.

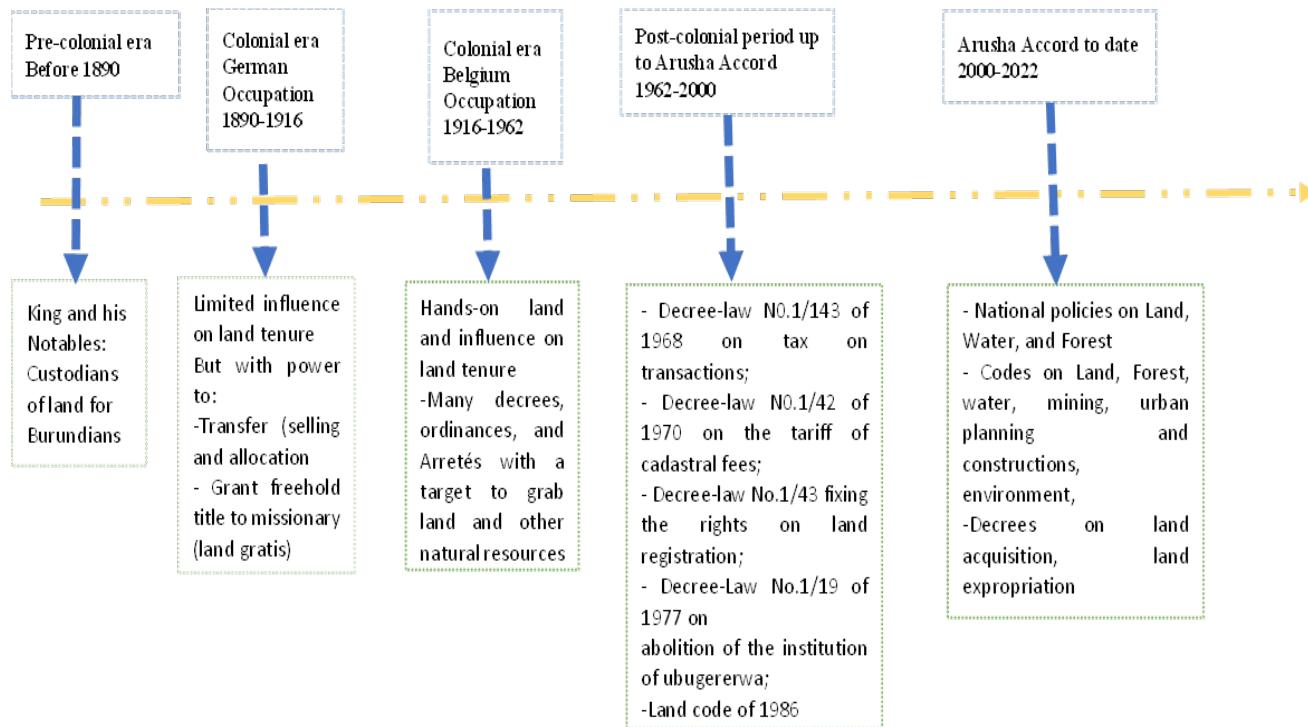


Fig. 1: Summary of Burundi land-related legal texts from the Pre-colonial era to 2022

Source: Author's compilation from desk review (2022)

However, the existence of all these land-related legal texts does not respond to the recurrent land-related problems that include the encroachment of public urban lands in urban and rural areas; land-related disputes between neighbours on boundaries; illegal change of land uses, and informal settlement in hazardous areas; and illegal as well informal transfer of public urban lands and protected areas. However, they have assisted in clarifying the boundaries of state land and some public urban lands in rural areas. However, they have not protected these lands against land grabbers and encroachers by elites and other powerful people in the country.

The KII and interviews with local leaders agree that legal texts are there, but lack implementation and enforcement. They outline three issues that pertain to the enforcement of legal texts that include (i) laissez-faire by policymakers and other influential people to protect public urban lands;

(ii) nepotism, favouritism, and corruption in executing some laws for their interests or of their relatives; and the politicization of land matters rather than implementation and enforcement of existing laws and regulations related to land management. These factors have been given by Bae (2019), Batterbury and Ndi (2018), and Rafiee and Stenberg (2018) on how elites use their power and influence to grab land. In Burundi, the public urban lands are grabbed by powerful people in the army, police, politics, and businesses. The existing legal frameworks are violated, and no one can question them since the court and land officers stay muted word in front of these persons.

4.1 Institutions Involved in public urban lands management

The existence of legal texts from pre-colonial to date marked also the existence of institutions that were responsible for implementing these texts. During the pre-colonial period, there were Kings, notables, and Bashingantahe³ who were exercising their power in land matters. In the colonial era, an appointed representative of colonisers confiscated the King's power in land dealing. Furthermore, the colonial era marked the start of modern land management institutions crafted by Europeans. The written certificate of occupancy was first delivered by Germans to missionaries. The large land held by the notables and King's descendants was taken from them during the colonial era, specifically during Belgium's occupation. All undeveloped land and public urban lands were nationalised during the Belgium colonisation to allow new allocation. In urban areas, prime land was given to white people, economically strategic land was given to Asians, and marginal land to Africans. The 2000-2022 mark an evolution of having institutions from the local level to central government as Fig. (2) shows. This structure emanated from the Madagascar Meeting with land experts. Step by step, Burundi restructured and decentralised the land administration system from the village level up to the national level.

³ Local elders at village level who were in charge of conflict resolution of all kind, land disputes included. It is a low-level traditional institution that remained from the precolonial up to date.

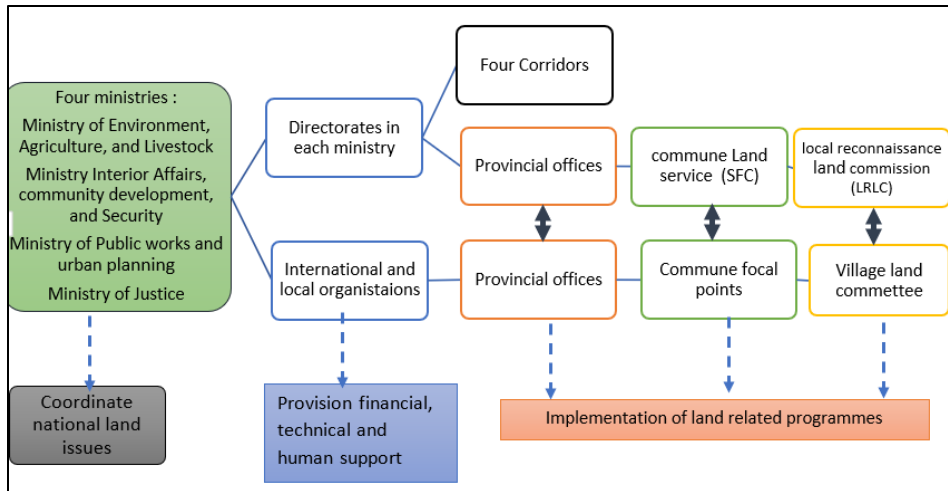


Figure 2: Institutional framework of land management in Burundi

Source: Author’s constructs based on findings (2022)

4.2.1 Public institutions involved in land management

The desk review results show that land management in Burundi is handled in four ministries. These include:

- Ministry of Interior, Community Development, and Public Security that is related to public administration from the provincial up to the village level. The main responsibilities related to land management include the coordination and mainstreaming of land administration issues that are under the commune-level level such as the land service at the commune level (SFC) and local reconnaissance land commission (LRLC). The NGOs and CBOs that are involved in land management activities are coordinated and monitored by this ministry at all levels accordingly.
- Ministry of Environment, Agriculture, and Livestock is concerned with land that is requested for agricultural use. The minister and his advisors are involved in analysing or proposing any land allocation for agricultural use.
- Ministry of Justice which has the responsibility to legalise all transactions, surveying, certifying, and titling land. This ministry assists in conflict resolution through court judgments.
- Ministry of Public Works and urban planning involved in urban land use planning and urban development control.

The decentralisation observed in land management was supposed to respond to land management challenges at all levels as appeared. However, the findings revealed the opposite. Issues related to certification, surveying, protection, and conflict resolution are still about the land sector in Burundi. Also, the political and elitism interference is pointed out as a hidden challenge, but with big impacts. They point out how cases in courts are decided by politically or economically powerful persons who became *Amicus Curiae brief*. Bae, (2019), Batterbury & and Ndi (2018), Rafiee and Stenberg (2018), and Olima (1998) disclosed the challenge of political and economic powerful people in land management. The same results manifest in Burundi, especially in managing public urban lands. Public urban lands are solely acquired by powerful politicians and investors (local and foreign) carefree. The existing institutions are overwhelmed and cannot make any decision without consulting them. Public urban lands are mismanaged in the eyes of these institutions despite their existence from the central to the local level.

4.2.2 Private Institutions in land management

Also, the involvement of private stakeholders is accounted to have been introduced in the past decade when International Organisations and local organisations/ Associations worked in the land sector to improve the land administration system. Private sectors and NGOs involved in land administration focus on reducing land-related conflict through land certification, clarifying boundaries, recording transactions systematically, and adopting new approaches to resolving land conflicts. The NGOs and Local Associations involved in land administration mostly came to assist returnees and Internally Displaced People (IDPs) to access the land that was taken after fleeing. Others came to assist the government in clarifying boundaries of public urban lands like National Parks and Forest Reserves to halt encroachment. In a few words, these NGOs came under the umbrella of post-conflict reconstruction and most of the projects were planned in ad-hoc and with fewer preparations technologically and technically.

Table 1: Private institutions involved in land management in Burundi

NGO or local association	Communes covered 129	Year of intervention	Area of focus	Achievements
HCR&CO	116	2001	Resolving land conflicts	614 cases
CNTB	116	2009	Resolving land conflicts and boundary clarification	3413 cases
PABG	14	2011-2014	Land certification	1782 certificates
DDC	6	2011-2015	Boundary clarification	875 inventoried 519 beacons fixed
ZOA	2	2014-2016	Certification + Land conflict resolution	
GIZ		2015-2018	<ul style="list-style-type: none"> - Public urban lands registration and boundary clarification - Land-related conflict resolution of public urban lands -Support land registration systems at the local and national level 	<ul style="list-style-type: none"> - 80% of Public urban lands registration and boundary clarification - 60% of Land related to conflict resolution of public urban lands - 75% Support land registration systems at the local and national level
LADEC	2	2021-2022	Boundary clarification and land certification of private properties	Ongoing project

Source: Turimubumwe (2022)

Several NGOs and Local associations are supported by development partners involved in land management. However, most actors have been focused in rural areas and less concern is observed in public urban lands.

4.3 Approaches and technologies applied in managing public urban lands

The successful implementation of land management intervention requires the application of operational approaches. In Burundi, the dominant approach used in public urban lands urban management by the government is the Top-Down approach. Being a classical land management approach that involves much technocracy, the land managers at different levels of the country do

not involve local people in the process. The KII with local leaders asserted that they are ignored in the public urban lands management process. They mentioned that they are only given orders to respect the plans and other laws that are formulated and adopted without their input. “That is why you have seen peaceful or dreadful demonstrations on expropriations and evictions in this country. People and local leaders are not consulted during public urban lands management”. If consulted, their views are not included. As mentioned by (Becker et al. (2003); and Salter et al., 2019) on participation, the non-inclusion of local people and NGOs has affected the implementation of land management strategies in Burundi. Also, some locals disclosed that involving non-supporters of the ruling party should not be possible. These are among the shortfalls that Bussu, et al. (2022) mentioned in handicap participation in developing countries.

Other approaches like FFP and others are considered costly or difficult to implement in the existing land administration system and infrastructure of Burundi. The respondents in KII converged on the same idea that other approaches are strict and costly, especially in their preparations, logistics, and contexts.

The use of modern technologies is also identified in this research as the challenge of adequately managing public urban lands. The interview results with government officers revealed that they are still using a mechanical theodolite, low-precision Global Positioning System (GPS), low-resolution satellite images, QGIS programme, tape measures, and other classic measuring tools. Some calculations are sometimes handled by simple calculators in the field. However, NGOs that are involved in land management are using some modern technologies and adapted software in data handling. The interview and desk review results disclosed that NGOs like PAGGF, GIZ, and LADEc have used technologies in spatial data collection, manipulation, and processing. However, they lament that they cannot afford the advanced technologies applied in developed countries. Chukwuma (2021), Stöcker et al.(2022), and World Bank (2017) mentioned how developing countries meet challenges of using UAVs, Advanced ArcGIS and other software, and high-resolution satellite imageries in land management and how to affect the proper land management. We add that the financial, technical, and human resource challenges may be a source of this failure to afford the new and advanced technology.

5. Conclusion and recommendation

Identifying the shortfall in managing public urban lands in developing countries is required to make sure interventions are mobilised to effectively manage these lands. Governments and development partners have been investing much effort in addressing land issues in developing countries by providing what was deemed to be necessary to curb land-related challenges, but the challenges persist and become a hindrance to achieving sustainable development. The paper tried to identify some of the shortfalls that hinder effective public urban land management in Burundi. The findings show that four major shortfalls include (i) the legacies of colonialism means that ownership of land is extremely contested by the poor and powerless and access to land is politicised; (ii) hidden agenda and hidden hand in all land deals; (iii) laissez-faire in land management to maintain the status quo of the chaotic situation in land management; and (iv) lack of partnership between public and private partners in land management to mobilise financial, technical and human resources so that new approaches and technologies in land management can be implemented in Burundi. The paper recommends that the Government of Burundi should collaborate with international and national partners to restructure the legal and institutional frameworks to afford the application of new approaches and technologies in public urban lands management.

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Declaration of Interest statement

The authors report there are no competing interests to declare.

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Gender Diversity in Real Estate Education: Evidence from an African Higher Education Institution

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Abstract

Workspace inclusivity remain critical in promoting diversity and dynamism across all sectors of the economy. Despite recent progress, gender disparities persist in the real estate sector, including education and training programmes. This study employs a quantitative research design to investigate gender diversity in real estate education at Federal Polytechnic Ede, Nigeria. The study focuses on female students' enrolment in real estate programmes from 2009 to 2022, their experiences, perceptions and career prospects. A self-administered questionnaire was used to collect data from 138 out of all the 150 female students currently enrolled in the programmes. The findings indicate that the gender structure of real estate student enrolments is inclusive. Female enrolments have steadily increased and are stable below 50 per cent over the last thirteen years. However, female students face a lack of mentorship opportunities and perceive gender discrimination and bias in the real estate industry. These factors influence female students' self-esteem, motivation, and career opportunities in the real estate industry. This paper contends that the real estate sector must become more diverse. A proactive dedication to inclusivity, mentorship and the willingness to challenge existing norms and biases in the industry is needed to enable women to pursue real estate career.

Keywords: Career decision; equity and inclusivity; female student enrolments; real estate industry.

Introduction

Inequalities along gender lines are critical concerns in today's global educational and professional environments. These issues have gained prominence recently as women face challenges in employment (Wieczorek-Szymanska, 2020), including education and social activities (Lombardi, 2017). Workspace equality and inclusivity remain essential in promoting diversity and dynamism across all sectors of the economy. Norberg and Johansson (2021) demonstrated that an environment with diverse teams and perspectives outperforms those that need to implement gender-related strategies effectively. Diversity and inclusion are priorities for high-performing organisations because they foster innovation (Ritter-Hayashi and Vermeulen, 2019), reduce interpersonal bias (Nishii, 2012), improve decision-making and outcomes (Clack and Gabler, 2019) and lead to the establishment of sustainable societies (Ceylan, 2020). However, despite a growing appreciation for diversity and inclusivity in various sectors, the real estate industry is still one of the most segregated worldwide (Mosimanegape and Ijasan, 2022). According to Oladapo (2017), the real estate sector has been predominantly male-dominated, with limited representation and participation of women. Poon and Brownlow (2016) also submitted that women are under-represented and lack career prospects in the construction industry. Ugwulebo (2011) noted that the gender gap in the workplace began during the training phase. Adogbo et al. (2015) and Bigelow et al. (2015) have shown that the percentages of female enrolments in construction-related disciplines

are mostly less than 10 per cent. As a result, the development of a genuinely inclusive and diverse real estate sector is hampered.

According to Castellano and Rocca (2014), ensuring equal educational opportunities for women should be the first step in addressing their unfavourable employment conditions. Higher education institutions are critical in developing the next generation of professionals and can influence change (Ekene and Oluoch-Suleh, 2015). Patterson et al. (2009) also observed that women face harassment and discrimination in education and training programmes, limiting their career advancement opportunities. Education institutions are responsible for more than just selecting the brightest students; they are also responsible for assisting women and underrepresented groups in breaking down social barriers (Lenaers, 2010). Unfortunately, Bradley et al. (2009) observed that women's representation issues in higher education need more attention.

Real estate is one of the fields taught in polytechnics and universities and is critical in preparing students for careers in property development, investment, valuation, management, and related aspects. It also has a direct impact on future real estate professionals' demographics. Gender exclusion, from a woman's perspective, can have several negative consequences for women and the growth of the real estate industry and society. It restricts women's access to the resources, experience, and skills required to succeed in the real estate industry and stifles role models and mentors for future generations. It fosters the belief that women are less significant and capable than men or less capable and better suited for certain professions. It also preserves traditional gender norms and prejudices. This limits women's prospects and impacts societal norms and beliefs, cementing gender disparities in society and the real estate industry. Because women are underrepresented in the real estate industry, which is critical to economic growth, the industry loses out on talent and new ideas, hampering long-term economic growth and sustainability. Regrettably, real estate education has received little attention in gender diversity research, particularly in the context of African higher education institutions. This study seeks to address this gap by investigating the gender diversity of real estate education at the Federal Polytechnic Ede (FPE) in Nigeria, examining female students' enrolment in the real estate programme, their experiences in real estate education, perceptions of the real estate industry and career prospects. The study acknowledges the different social, cultural, and economic dynamics that influence gender roles and possibilities for women in the African context. This study will add to the knowledge of gender equality in higher education by providing valuable insights into the dynamics and implications for the sustainable increase of female students in real estate programmes in Nigeria and other African countries. This study seeks to address the following questions: What are the total enrolments of real estate students at Federal Polytechnic Ede, Nigeria, between 2009 and 2022? What are the percentages of female students' enrolments between 2009 and 2022? What are the experiences of female students in real estate education? How do female students perceive the real estate industry? What are the female students' career prospects? The remainder of this paper is structured as follows: the introductory section is followed by the study area in section two.

Sections three and four present the literature review and methodology, while section five discusses the study's results. The paper closes with a conclusion.

Theoretical Framework and Literature Review

Tokenism Theory

The phenomenon of tokenism, a derivative of gender discrimination, is the foundation for this investigation. Kanter (1977)'s theory of tokenism defined groups with a representation rate of less than 15% as "tokens". Strohine and Brandl (2011) noted that tokens are expected to face difficulties and hardships, such as a lack of opportunities. Kanter developed the theory to explain the effects of token status on women's career development in male-dominated environments. The tokens are the minority individual in their group and are said to face various limitations and restrictions due to their numerical inadequacy. Kanter drew attention to the numerical inequality of token individuals within the group and mention'd four different groups according to their numerical representation ratios. These are the uniform groups (with a typical ratio of 100: 0), skewed groups (with a typical ratio of 85:15), tilted groups (with a typical ratio of 65:35) and balanced groups (with a typical ratio of either 60:40 or 50:50). This study employs Kanter's theory of tokenism to investigate the numerical inequality in real estate students' enrolment at Federal Polytechnic Ede in Nigeria. Tokenism is evident in career paths where one gender predominates over the other (Mosimanegape and Ijasan, 2022).

Female Student Enrolments in Higher Education

Women lag far behind men in global literacy and higher education statistics in scientific and technological disciplines (Ahmad, 2009; Williams, 2006; Adeyemi & Akpotu, 2004). Female students enrolled in higher education institutions at a lower rate than male students (Almelhem et al., 2022; Wiczorek-Szymanska, 2020; Shayan, 2015). Even if the participation trend has favoured women in advanced countries, it is still being determined whether the same trend exists in emerging countries (Ahmad, 2009). Dada (2017) posited that the proportion of women enrolled in higher education in developing countries is frequently less than half that of men. While many women enrolled in higher education, Odaga (2020) discovered this was only true in a few faculties. According to Adeyemi and Akpotu (2004), there is a significant separation between the sciences and science-based fields. Women are underrepresented in built environment courses, so changes must be made (Dada, 2017). The built environment disciplines, including real estate, are "male-dominated" and lack diversity and inclusion (Soo-Cheen, Sanmargaraja and Soon-Ham, 2020). Research has confirmed that men predominate among real estate students enrolled in Nigerian universities (see Ayodele, 2018; Peter et al., 2017). Oladapo (2017) remarked that from the commencement of the real estate profession in the early 1970s to the present day in Nigeria, there had been a gender disparity in the enrolments of pupillage estate surveyors and valuers and students in all universities offering the course. Dainty and Edwards (2003) observed a decline in female enrolment in building-related courses in the UK. Ahmad (2009) discovered that there were

more males in technical courses such as engineering, architecture, town planning, quantity surveying, and real estate management in Malaysia.

Existing studies have shown that the recorded percentages of female enrolments in the UK and US are mostly less than 10 per cent (see, Adogbo et al., 2015; Bigelow et al., 2015; Sewalk and Nietfeld, 2013; Shane et al., 2012; Del Puerto et al., 2011). In a recent Nigerian study, Dada (2017) reported that the percentage of female enrolment in construction-related programmes remains below 30 per cent on average. Studies of female enrolments in other fields reveal varying patterns. For example, Adeyemi and Akpoku (2004) discovered that female enrolment in the Humanities (education, arts, and social sciences) ranged between 35.60 per cent and 48.86 per cent. Faleye and Dibu-Ojerinde (2006) reported that the average female student enrolment in education/economics programmes is 40.5 per cent. Agu and Omenyi (2013) found an average of 50.8 per cent for female enrolment in management sciences, including accountancy, banking and finance, business administration, marketing and public administration. However, Momoh et al. (2020) found that female student enrolment in the business is below 30 per cent.

Meanwhile, there are pieces of evidence suggesting an improvement in female students' enrolment in construction-related courses. Oo and Widjaja (2018) examined the enrolments of female students in construction management programs at three universities in Australia from 2006 to 2015. The universities studied are the University of New South Wales (UNSW), the University of Newcastle (UON), and Western Sydney University (WSU). The results revealed a steadily increasing trend in three Australian universities' female enrolments in CM programs in the study period. At the same time, the percentages of female student enrolments for the WSU were relatively stable at below 5 per cent. UON and UNSW, on the other hand, had recorded percentages greater than 10 per cent. Ahmad (2009) earlier reported an increasing trend in the percentage of female enrolment in technical courses in Malaysia.

Female Students' Experiences, Perceptions and Career Prospects

Many factors influence a woman's career path, including personal characteristics, experiences and perspectives on the discipline and working environments (Dainty et al., 2000). According to previous research, female students studying construction-related disciplines face challenges such as male-dominated instructors (Adogbo et al., 2015; Shane et al., 2012), limited networking opportunities, difficulty finding female role models and mentors (Chiwuzie et al., 2022), discrimination (Dada, 2017; Lombardi, 2017; Francis and Prosser, 2014), male culture in the classroom (Ling and Pei Poh, 2004), intimidation by the male counterpart and gender-based harassment (Dada, 2017). Existing studies on female graduates' perceptions of the industry have found that the profession is perceived to be male-dominated; roles are also perceived to be competitive, demanding, stressful, and require long hours (e.g., Oladapo, 2017; Adogbo et al., 2015; Ling et al. 2016). Male culture, gender stereotypes, the glass ceiling, and the lack of professional female mentors and role models are all issues in the sector (Chiwuzie et al., 2022; Astor et al., 2017). Other perceptions about the industry include a lack of infrastructure that allows

women to resume work after taking time off to care for family responsibilities (Ling et al., 2014) and restrictive and extended work schedules (Barreto et al., 2017); work-life balance concerns (Barreto et al., 2017), bullying and harassment (Dainty et al., 2000), unequal career opportunities for men and women (Phathara-on et al., 2016), and a higher risk of unemployment for female real estate graduates (Poon and Brownlow, 2016). These graduates' perspectives align with studies on professional women in the real estate industry (e.g., Olawunmi et al., 2020; Oladapo, 2017; Ling et al., 2016). It has been argued that women generally "build their career trajectories based on their previous experiences and perceptions of the real estate practice environment" (Chiwuzie et al. 2022, 158). Studies have shown that women lack career prospects in the industry (Poon and Brownlow, 2016). The lack of professional opportunities and possibilities for women in the construction-related industry is attributable to "an atmosphere of dominant masculinity" (Sagebiel, 2003) and anti-women attitudes (Dada, 2017). However, Chiwuzie et al. (2022) found that 63.4 per cent of graduating female students surveyed expressed a desire to work in professional real estate firms after graduation. Oo and Widjaja (2017) also discovered that many female construction management and real estate students confirmed their intention to remain in the industry for at least the next ten years.

From the preceding, previous research results on gender diversity and female enrolment are inconsistent. Furthermore, most gender diversity research has focused on a specific built environment discipline, such as construction (Dainty et al., 2000; Francis and Prosser, 2014; Ling et al., 2016; Oo and Widjaja, 2017; Dada, 2017) or on group disciplines (Dainty and Edwards, 2003; Ahmad, 2009). Similar studies in real estate have focused on gender diversity in the industry (Mosimanegape and Ijasan, 2022; Poon and Brownlow, 2016; Oladapo, 2017). However, studies on gender and enrolment issues in real estate education are scarce. Ahmad (2009) investigated the gender and enrolment of estate management students in Malaysia, but the paper classified estate management students as one of five technical course groups, which included engineering, architecture, town planning, quantity surveying, and real estate management. There have yet to be studies on gender and real estate student enrolment in Nigeria, particularly in the Polytechnic context, hence, the need for this study. It is worth noting that the lack of gender diversity in real estate education due to low female enrolment limits the pipeline of qualified female professionals entering the industry, thus, stifling its overall growth and potential.

Methodology

This research employed a case study method using a Polytechnic. The Federal Polytechnic in Ede, Nigeria, was founded in 1992 as a public higher education institution. The Polytechnic has eight schools and thirty-one departments, each offering two-year programmes leading to National Diploma (ND) and Higher National Diplomas (HND) awards. The School of Environmental Studies (SES) now has five active departments: architectural technology, building technology, estate management and valuation, fashion and textile technology, quantity surveying and surveying and geo-informatics. The estate management and valuation department launched ND

and HND programmes in 2000 and 2009, respectively. The ND program is the first step, after which interested and eligible diplomats can reapply to pursue the HND. Obtaining an HND is a five-year course occurring at different levels, including two-time industrial training. To begin, students enrol in ND and, at the end of their first year, proceed on a three-month industrial training through the “Students’ Work Experience Scheme” (SIWES). The second industrial training lasts one year and begins once the ND programme is completed. This field training aims to expose students to the actual world of work while also providing a platform for students to gain a sense of what the course entails. Evidence of one year of industrial training is mandatory for admission into the HND programme.

This study was conducted in two phases. For the study’s first phase, secondary data on students’ enrolment in the Department of Estate Management and Valuation, FPE, from 2009 to 2022 were acquired from the department’s examination officer. It should be mentioned that the Polytechnic’s 2014 academic year was cancelled. In the second phase of the study, all 150 female students currently enrolled in Estate Management and Valuation programmes were asked to fill out a questionnaire on a five-point Likert scale (1 = strongly disagree – 5 = strongly agree). A total of 138 copies of the questionnaire were returned, representing a 92 per cent response rate. The questions in the questionnaire were drafted based on the various influencing factors identified in the literature (Chiwuzie et al., 2022; Oo and Widjaja, 2018; Dada, 2017; Oladapo, 2017; Poon and Brownlow, 2016; Ling and Pei Poh, 2004). These factors impact female students’ carrier decisions regarding construction management and other construction-related disciplines. The questions were slightly modified to assess female students’ experiences, perceptions and career expectations in the context of the real estate profession. Table 1 contains the questionnaire items, which are essentially grouped into three categories: students’ experiences in real estate education, perceptions of the real estate industry and career prospects.

Descriptive statistics (percentages and mean scores) and a one-sample t-test were employed for the data analysis. First, data on students’ enrolments for ND and HND programmes in the Department of Estate Management and Valuation, FPE, from 2009 to 2022 were analysed using percentages. The analysed data were presented in bar charts and line graphs to determine the total enrolment trends and the percentages of female student enrolment trends, respectively. Second, the mean scores and standard deviations for students’ responses to the individual measurement items were calculated. Third, a one-sample t-test was employed to determine the significance of the mean scores and, by extension, the student’s responses. The sample’s mean scores were compared to a test value of 3 (i.e., the neutral score) to determine if students at least agreed (mean score statistically greater than 3), disagreed (mean score statistically less than 3) or were neutral (mean score statistically equal to 3). Oo and Widjaja (2018) suggested that this test, in contrast to simple averaging, provides an objective assessment in selecting the item(s) that must be addressed. Before the analysis, the internal consistency of the scales employed in the questionnaire was confirmed using reliability analysis. Table 2 displays Cronbach’s alpha coefficients for each questionnaire construct, indicating that all variables are reliable.

Table 1: Measurement items on female students’ experiences, perceptions and career prospects

Category	
<i>Students’ Experiences</i>	
E1	Male-dominated Lecturers and Instructors
E2	There is no discrimination against female students
E3	Male culture exists in the classroom
E4	Female students are intimidated by their male fellow students
E5	Female students face gender-based harassment
E6	Gender biases influence female students’ self-esteem, motivation, and academic performance.
E7	There is a lack of networking and mentorship opportunities
<i>Students’ Perceptions of the real estate industry</i>	
P1	The real estate industry is male-dominated
P2	Women are less likely to be employed in the real estate industry
P3	The real estate industry operates restrictive and long working hours
P4	Real estate practice is competitive and stressful
P5	Gender biases and stereotypes exist in the real estate industry
P6	Lack of women role models and mentors in the real estate industry
P7	Women face harassment and bullying in the real estate industry
P8	I feel that real estate practice is “masculine.”
<i>Students’ Career prospects</i>	
C1	I plan to work in real estate firms after graduation
C2	I intend to remain in the industry for the next ten years.
C3	Females have equal access to the same career opportunities as men.
C4	The prospects are equal for men and women
C5	Women receive adequate career support, such as career planning and mentoring.

Table 2: Cronbach’s alpha coefficient for the constructs of the questionnaire

Construct	Number of Items	Cronbach’s Alpha
Students’ experiences	7	.972
Students’ perceptions	8	.986
Students’ career prospects	5	.977

Findings

This first section of the results discusses the enrolment patterns for ND and HND programmes in Estate Management and Valuation Department at Federal Polytechnic Ede, Nigeria, from 2009 to 2022. Figure 1 depicts the total enrolments over the study period, demonstrating the consistent upward trends for both programmes. In comparison, enrolment in the ND has gradually increased over the last thirteen years, whereas enrolment in the HND soared between 2020 and 2022. The department’s success in securing approval to admit two streams (each with 40 students) for the HND programme explains the observed trends. These rising enrolment rates in real estate diplomas

contrast the declining patterns in the UK's building-related courses reported in Dainty and Edwards (2003).

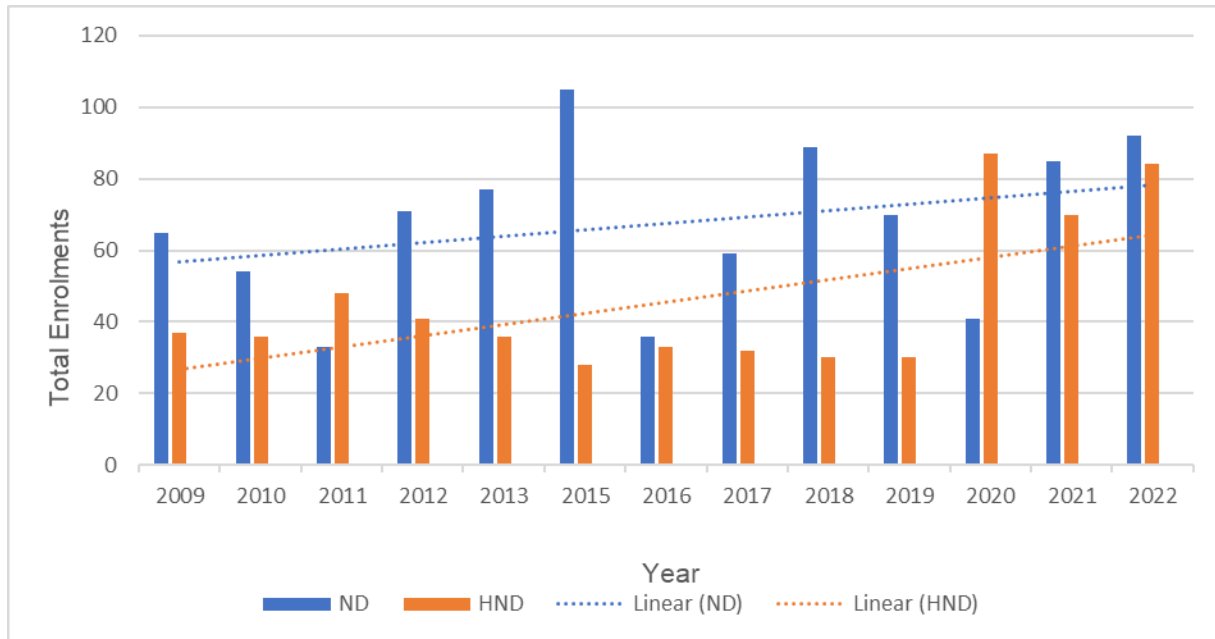


Figure 1: Total Enrolment in Estate Management and Valuation Programmes, 2009-2022

Source: Analysis of survey data

Next, the percentages of female student enrolment trends were investigated, and the results are presented in Figure 2. According to the trend lines in Figure 2, the percentages of female student enrolments for ND and HND are stable below 50 per cent in the past thirteen years. Enrolments in both programmes peaked in 2021; while the recorded rate for HND is just under 60 per cent, ND is slightly above 60 per cent. Surprisingly, the observed percentages of more than 30% in ND and HND for most of the study years contradict the findings in Dada (2017) and statistics from other universities, as noted in the literature review. The analysis results reveal a balanced gender structure of real estate student enrolments, suggesting that the real estate education at FPE is inclusive. There are several advantages to achieving gender inclusivity in real estate education student enrolment. First, it promotes diversity within the field by fostering an inclusive learning environment where all students feel valued and respected. It creates a safe space for open discussion and collaboration, enabling students to learn from each other's unique experiences and perspectives. It enables women to acquire the knowledge and skills to navigate and succeed in a traditionally male-centric field. It will also help to dispel societal stereotypes about gender roles and expectations, as well as challenge the notion that certain professions are only appropriate for one gender. This shift in perception may encourage more women into real estate and related disciplines and inspire role models and mentors for future generations. The real estate industry is typically male-dominated, but with gender parity in enrolment, women can gain the knowledge

and confidence required to pursue careers in the industry. Bigelow et al. (2016) in a study of construction management students suggested that an increase in women earning construction management degrees will lead to increase the number of women in the construction industry. The following section presents the analysis of responses from the questionnaire regarding students' experiences in real estate education, perceptions of the real estate industry and career prospects.

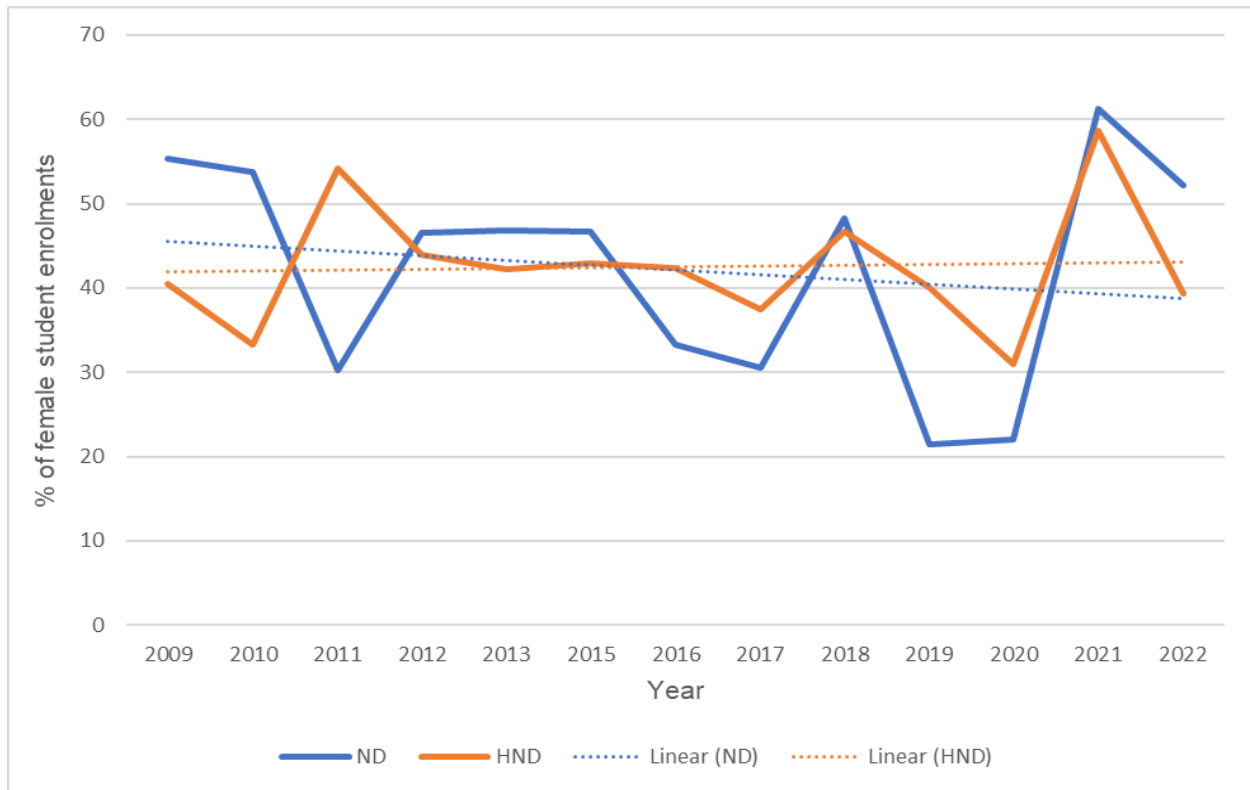


Figure 2: Percentage of female enrolment in Estate Management and Valuation programmes, 2009-2022.

Source: Analysis of survey data.

In this second section, the survey results are discussed. Table 3 shows the profiles of 138 surveyed female students in the ND and HND Estate Management and Valuation Department at Federal Polytechnic Ede, Nigeria. Table 3 reveals that ND II students comprised 31.2 per cent of the study's sample. One group of the students (71.0%) had prior work experience in the real estate industry, with most of their employment during their industrial training. Although 54.3 per cent of the surveyed students moved to estate management due to a change in the course during the admission process by the institution or academic incapacitation, 88.4 per cent of them found estate management interesting. The survey includes first-year (ND I) students and students with prior real estate work experience. The ND I students have just been in their programme for two months and are barely halfway through their first semester. Other students (ND II, HND I, and HND II) had worked in the real estate industry for at least three months while enrolled in their studies;

hence, their responses about their real estate education experiences, perceptions of the real estate industry, and career prospects were considered reliable. As a result, only these student groups were employed in the subsequent analysis, the results of which are presented in Table 4.

Table 3. Profiles of current female students in the Estate Management and Valuation programmes (n = 138)

Characteristic	Frequency	Percentage
<i>Age group</i>		
18-20	26	18.8
21-23	56	40.6
24-26	45	32.6
27+	11	8.0
<i>Level of study</i>		
ND I	40	29.0
ND II	43	31.2
HND I	26	18.8
HND II	29	21.0
<i>Work experience in the real estate industry</i>		
Yes	98	71.0
No	40	29.0
<i>Type of work</i>		
Full time	5	3.6
Part-time	0	0.0
Industrial training	93	67.4
<i>Years of work experience in the real estate industry</i>		
< 1 year	43	31.2
1-2 years	50	36.2
>2 years	5	3.6
<i>Incidence of enrolling in the Estate Management and Valuation ND programme</i>		
Personal Choice	63	45.7
Change in course during the admission process by the institution	71	51.4
Change due to Academic incapacitation	4	2.9
<i>Rating of interest in Estate Management and Valuation</i>		
Interesting	122	88.4
Neutral	13	9.4
Not interesting	3	2.2

Source: Analysis of survey data.

Table 4 displays the one-sample t-test outcomes for the measurement items. Regarding students' real estate education experiences, the respondents strongly disagreed that the faculty was male-dominated (E1). Indeed, the estate management and valuation department is one of the most

gender-diverse at Federal Polytechnic Ede. The department comprises sixteen faculty members, nine of whom are female. The students did, however, agree that there is a male culture in classrooms (E3) and a lack of networking and mentorship possibilities (E7). These factors influence female students' self-esteem, motivation, and academic performance (E6), which may affect their career opportunities in the real estate industry. Chiwuzie et al. (2022) reported limited networking opportunities and difficulty finding female role models and mentors as impacting female students' experiences in real estate education. The presence of diverse role models fosters inspiration, motivation, and confidence in pursuing real estate careers, regardless of gender. When young aspiring real estate professionals see individuals of all genders succeeding in the field, they are more likely to believe they can achieve the same success. Furthermore, the findings show a lack of agreement on female students being intimidated by male fellow student counterparts (E4) and the occurrence of gender-based harassment (E5). These findings imply that some female students would have considered these items a significant challenge. Meanwhile, earlier research (Barreto et al., 2017; Adogbo et al., 2015; Francis and Prosser, 2014) has identified each factor as a significant challenge.

Table 4: One-sample t-test results for female students' experiences, perceptions and career prospects

Item	Mean	SD	t-value	Sig (2-tailed)	Remark
E1	1.67	.756	-20.602	.000	Sig.
E2	3.24	1.370	2.051	.042	Sig.
E3	3.68	1.399	5.721	.000	Sig.
E4	3.03	1.377	.247	.805	Not Sig.
E5	2.89	1.327	-.962	.338	Not Sig.
E6	3.86	1.233	8.214	.000	Sig.
E7	3.72	1.367	6.165	.000	Sig.
P1	3.95	1.069	10.429	.000	Sig.
P2	3.75	1.238	7.080	.000	Sig.
P3	3.86	1.179	8.593	.000	Sig.
P4	2.93	1.412	-.603	.548	Not Sig.
P5	3.88	1.217	8.464	.000	Sig.
P6	3.72	1.367	6.165	.000	Sig.
P7	3.06	1.464	.465	.642	Not Sig.
P8	1.90	1.048	-12.342	.000	Sig.
C1	3.56	1.430	4.585	.000	Sig.
C2	3.51	1.441	4.194	.000	Sig.
C3	2.30	1.223	-6.753	.000	Sig.
C4	2.56	1.351	-3.844	.000	Sig.
C5	2.80	1.476	-1.615	.109	Not Sig.

Source: Analysis of survey data

On the female students' perceptions of the real estate industry, the results show that female students agree that the real estate industry is male-dominated (P1), that women are less likely to be employed in the real estate industry (P2), that the real estate industry operates with inflexible and

long working hours (P3), that gender biases and stereotypes exist in the real estate industry (P5), and that there is a lack of female role models and mentors in the real estate industry (P6). Women experiencing harassment and bullying in the real estate industry were also identified (P7), with a mean score of 3.06 which was not statistically significant. Furthermore, while female students agreed that real estate work is competitive and demanding (P4), they disputed that real estate practice is masculine (P8). These findings align with responses from graduating real estate students who reported their likelihood of working in real estate firms and recent female graduates in real estate practice in Chiwuzie et al. (2022) as well as professional women working in the real estate industry in Olawunmi et al. (2020). These industry factors appear not to negatively impact the respondents' decision to pursue a career in real estate. This assertion is supported by their responses to career prospects items C1 and C2, in which they agreed with the stated intention to work in real estate firms after graduation and would likely remain in the industry for an extended period. However, students disagreed with items C3 (females have equal access to the same career opportunities as men) and C4 (the prospects are equal for men and women), while responses to item C5 (women receive adequate career support, such as career planning and mentoring) were mixed and not significantly greater than the neutral.

Overall, the analysis of female students' perceptions indicate that there is a lack of diversity and inclusivity in the real estate industry. As a result, for long-term economic growth to be sustained, the real estate sector must become more diverse. Promoting diversity in the real estate industry necessitates a proactive strategy, a commitment to inclusivity, and the willingness to challenge existing norms and biases. It is critical to create an environment in which everyone, regardless of gender, has an equal opportunity for success and development. It is also critical to provide mentorship, training, and a network of support for women in real estate to further their careers. This can help to dispel gender stereotypes and encourage more women to enter, remain and succeed in the field, resulting in a more equal and diverse real estate professional community. Studies such as Norberg and Johansson (2021), Ceylan (2020), Ritter-Hayashi and Vermeulen (2019) and Nishii (2012) have shown that diverse teams outperform homogeneous teams in terms of performance, creativity, and problem-solving abilities.

Conclusion

This study examined gender diversity in real estate education at Federal Polytechnic Ede, Nigeria, focusing on female students' enrolment, experiences, perceptions, and career prospects. According to enrolment data, the gender structure of real estate student enrolments is balanced, suggesting that the real estate education at FPE is inclusive. Female enrolments in ND and HND programmes have steadily increased and are stable below 50 per cent over the last thirteen years. The survey results also revealed that female students face a lack of networking and mentorship opportunities, which impact their self-esteem. Furthermore, female students perceived gender discrimination and anti-women attitudes as prevalent in the real estate sector; however, these industry elements would

not deter female students' decision to pursue a career in the real estate industry. Historically, real estate, like other construction-related disciplines, has been male-dominated, with women facing barriers and biases that have restricted their participation and advancement. By promoting equal gender representation in real estate sector, these barriers can be dismantled. Gender parity in enrolment and an inclusive learning environment can improve female students' experiences. This will, in turn, encourage women to pursue real estate careers, provide them with the necessary skills and knowledge to succeed. Consequently, the real estate industry must become more diverse. A proactive dedication to inclusivity, mentorship and the willingness to challenge existing norms and biases is needed to enable women to pursue real estate careers. This will ensure a steady stream of female professionals into the industry, leading to more innovative and sustainable real estate professional community. The results of this research are significant for academic Institutions, policymakers and industry stakeholders interested in creating a more diverse and inclusive real estate sector. This study adds to the knowledge of gender diversity in African higher education institutions, particularly within the Polytechnic context. This study has limitations. We acknowledge that the study focuses on female real estate students in just one institution, which could constitute bias; consequently, generalization of the results is difficult. Nonetheless, it does leave potential for more research in this area. Longitudinal and qualitative studies involving participants from several higher education institutions, cultural circumstances, Alumni and the industry are needed to improve the results. Furthermore, including male participants to provide their experiences and perceptions would give fair assessments.

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Rural land management and valuation in Zimbabwe: Challenges and Prospects

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Abstract

Rural land value is variegated, spanning from spiritual to economic value. Despite a diverse value perception of land by differing people, the aspect of land management remains constant. Effective rural land management continues to be a necessary and innovative stimulant of land value in the face of increasing population and competing land uses. Using document analysis, this article seeks to unravel Zimbabwe's rural land management system and its impact on land value as an economic concept. It is the argument of this paper that the management of rural land is sporadic, asymmetrical, ineffective and inefficient to the detriment of its economic capabilities. Its valuation framework is unstructured and almost undefined. This article also shows that Zimbabwean rural land management and valuation policies have deprived the land of its potential. It further recommends a rural land management model consolidating scattered land laws and adopting international best practice recommendations.

Key words: Rural land; Land management; Land valuation

Introduction

The Zimbabwean government embarked on a massive land seizure of former privately-owned farms and redistributed them to the landless natives in the year 2000 onwards (Mkodzongi & Lawrence, 2019). The program was aimed at redressing colonial land ownership imbalances. This increased the government's obligation on rural land management, on top of the already existing communal land which was being administered under the Communal Land Act (20:04). The scale of land redistribution overwhelmed the government's capacity for land management including land policy, land administration, land valuation, land information and land dispute resolution. The challenge is yet to be addressed. Also, though the programme facilitated access to the physical and natural capital to thousands of families (Moyo, 2011 and Kabonga & Were, 2020), it disturbed the land market, by the gazetting of properties which were held as collateral in the banks, which in turn compromised the market value of the gazetted land. Notwithstanding the diminishing market value of rural land in the real estate sector, rural land in Zimbabwe continued as a source of nourishment for many livelihoods.

Rural land is land that is not urban (U. S. Census Bureau, 2017). Amongst its many attributes, rural land in Zimbabwe is endowed with economic capabilities. It is a source of livelihood to its inhabitants through its agricultural potential and mineral deposits among many. Rural land in Zimbabwe constitutes at least 90% of the total hectareage of the country, and it falls under agriculture and other rural economic activities, which provide income to about 65% of the total population (FAO, 2023). Despite a percentage decline in agricultural contribution to the Gross

Domestic Product (Government of Zimbabwe, 2021 and World Bank, 2023), rural land remains an important factor in the general growth of developing economies (Azadi & Vanhaute, 2019). Therefore, the achievement of the Zimbabwean government's objective of attaining a middle-class economy by 2030, as premised in its National Development Strategy 1 (NDS1) economic blueprint, is possible, if the national leadership's mantra of "leaving no place and no one behind" adopts and seriously considers optimal rural land management models, which stimulate land value.

Rural land management and valuation systems aim at managing the relationship between humans and land to the best value outcome. Some economic value theorists believed that land has intrinsic value (Petty, 1690; Cantillon, 1755 and McGovern, 2007), meaning, the value of land is objective. However, North (1969), argued that value is not objective but subjective, as it is a product of man's imputation. Both arguments are important in the management of rural land in an effort to maintain its value and discover its benefits. Whether the land is intrinsically valuable or its value is the product of the acts of man, point to the importance of effective, efficient and sustainable acts of man on land to both maintain and improve value. Therefore, if optimal rural land management systems, underlined by secure tenure systems, are employed, there are possibilities of reducing poverty and mitigating the effects of climate change among many benefits, hence improving the value of land and stimulating the land market in the country. However, best rural land values, income potential and productivity are not realised as a result of the fragmentation of Land Policy Guidelines. As land plays a fundamental role in human livelihoods, it is governed by national legal and institutional frameworks. Literature exists on rural land management in Zimbabwe but it has not looked into its relation to valuation. This article analyses the legislation and institutions that inform this, recommending an optimal framework with a view to enhancing rural land management and valuation systems in Zimbabwe.

Literature Review

Concepts of land, rural Land, land management and land value

Rural land, its management and value has been dominating both policy and scientific discussions (Brouwer & Van der Heide, 2009). Land is a composite of the elements of the biosphere immediately below and above the earth's terrestrial surface (UNCCD, 2014). These include the pedological, geological, hydrological and botanical elements. Of the habitable land of the earth's surface, almost 80% of it is considered rural, constituting of agricultural activities and forests (Ritchie and Roser, 2013). Rural land is identified by its characteristics which include agriculture, natural resources and lesser human development (Dasgupta, et.al., 2014). Humans in the rural set-ups around the globe interact with either or all of the given elements for social, political and/ or economic development. To some, land is a factor of production, to others, it is nativity, whilst others consider it their spiritual domain. The relationship between humans and the terrestrial elements, despite differing perceptions about land, is what either improves, maintains or degrades the land value. This relational activity is what can be called land management.

Land management involves several processes and systems which can be identified through various concepts, such as land policy, land governance, land management and land administration

(Masum, 2017; Mattson and Mansberger, 2017). It is defined by Chigbu (2019) as an efficient, effective, participatory and responsible practice of conceptualizing, designing, implementing and continuously evaluating the socio-spatial interventions on land so as to achieve sustainable goals. Land management paradigm by Enermark (2005) was used as a launching pad for this paper. This paradigm synthesizes land policies, land information systems and land administration processes for the achievement of sustainable development goals. It also shows that land value is a subject of land management. This is supported by (Ahmed and Nassar, 2014), who observed that there is a converse relationship between land management and land value.

Land valuation is the opening of an independent land value by a professional valuation practitioner, at a given date, within set conditions and timelines, taking into consideration multiple factors (RICS, 2023; IVCS, 2019; Blackledge, 2009 and Peca, 2009). There are three approaches to land valuation which include market, income and cost approach. The market approach establishes value based on values of comparable land sites which would have been transacted in the near past. The income approach computes land value based on the anticipated benefits from the land. Using the cost approach, land value is calculated based on the replacement cost of the piece of land. Land value is a product of the land valuation process. It is variously understood. Wuensch, Kelly, and Hamilton (2000) proposed that, for an easy understanding of land valuation, certain underlying principles should be understood. These include;

- a) **Anticipation-** The land value is dependent on the highest and best use, not its current uses, meaning that land's present value depends on what future benefits are derived from it. In order to establish the value of a piece of land, it is necessary to estimate the stream of benefits which may be generated over time (Bell and Bowman, 2006). The principle entails the income approach of valuation
- b) **Change-** Land value should be assessed on a regular basis due to changes in economy, legal and societal factors. The principle of change supports the market approach of valuation.
- c) **Substitution-** The cost of buying an equivalent replacement site in the same locality determines the best land value. The principle informs the cost approach of valuation.

Land management and valuation systems are premised in nations' legal and institutional frameworks. These frameworks inform how land policies, land administration processes and land information systems interact for the sustainable achievement of development goals. Land policy is understood as the governments' intervention on how people relate to land so as to achieve economic, social and environmental goals (Vejchodska, et.al., 2022 and Davy 2012). These include, inter alia, how to protect land from degradation, equitable distribution of land, taking of land for public use and compensation after expropriation. Land administration is defined by the United Nations Economic Commission for Europe (UNECE) (1996) as the process of determining, recording, and communicating information regarding land ownership, value, and use, as well as related resources. Land information system is the collection, storage and analysis of land related data to support land related decision making by individuals, corporates and governments (Hallet, et.al., 2017 and Nahrin and Rahman, 1970). These land management elements differ by country or community. However, with acceptable and proper combination of land policies, land information systems and land administration processes, there are positive prospects of improved

land value (World Bank, 2017 and ELD Initiative (2015), which is the price, worth or cost of land depending on perspective.

Land management around the globe

The Sustainable Development Goal (SDG) 15 urges for the promotion of sustainable land management practices as a way of safeguarding, restoring and promoting sustainably the use of natural resources (Neshovski, 2023). The World Bank has, on several instances, around the globe, offered assistance by financing, providing technical assistance and supporting research on land management (Bell, 2020). This is due to the fact that; land is finite whilst demand for different land uses is increasing. The Food and Agriculture Organization of the United Nations (FAO), (2022) recommends sustainable land management practices for an optimal outcome through its Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security. It is of no dispute that these international agencies and others around the globe recognise the importance of land management to the outcome of maintained and improved land value. Without proactive attention to the issue of land management, there will be increased land degradation and land pollution to the effect of loss of land value.

A study on the land management policy in European countries was done by Auzins, et.al., (2022). The study sought to recommend for the improvements on the land management institutional frameworks. Using comparative analysis and based on the assumption of a common land policy which integrates all land related government statements and laws, the study found out that, in most countries, the land use legal framework is not well defined due to the scattered land related issues in different sectors and laws. The study further recommended for the establishment of a cross-sectoral platform for land management which is a unifying land policy so as to promote a balance between the private and public interests, thus balancing land value from all angles; social, economic, political and cultural. Another study on sustainable land management in Asia was done by Shoyama, et.al., (2020). According to this study, Asian countries may be faced with land management problems due to an expected lack of space as a result of population growth. The study recommended that, to keep abreast with changing times, land management practices should be formulated and regularly assessed on a participatory approach, which will enable all concerned stakeholders' contributions reflect in the common land policies.

From an African perspective, despite a worldwide call for sustainable land management practices so as to aid sustainability and improve land values. Africa continues to suffer from land related resources depletion mainly due to poor land management practices (ELD Initiative, 2013 and Pender, et. al. 2006). In African conception, land is owned by the dead, the present and the unborn (Kendie, n.d), meaning, its value goes beyond its economic value, it defines people's being, existence and identity. Like any other continent, Africa is also experiencing a booming population growth, which further exposes the effectiveness or efficiency of the land management practices. People in Africa relate to land through a multi-tenure system as a result of colonial process, which brought in the freehold and leasehold registrable tenure system, backed by cadastre, on top of the already existing customary tenure (Sutz, 2021; Cotula. Et. Al., (2004). The existence of many

tenure systems and different laws within the same society is called legal pluralism and is thought to have governance implications (Swenson, 2018; Merry, 1988), which possibly could be a cause of weaker land management and valuation systems in Africa.

Land valuation and the global perspective

It should be appreciated that, for the efficiency of duty execution, rural land managers and valuers need finances, hence the necessity of rural land valuation for rural land levy formulation and revenue collection. Land valuation is defined as the formation of value of real estate property under given specific conditions (Peca, 2009, Wyatt, 2007 and Millington, 2000). Various methods of land valuations are used as determined by purpose and legal guidelines. Most international organizations have forwarded recommendations about rural land valuations when governments exercise the power of eminent domain. Both the International Finance Corporation (IFC), 2012 and FAO, (2022) recommended that the compensation payment should be done after a transparent and all-stakeholder participatory valuation of land with economic, customary, cultural and social considerations. The International Valuation Standards Council (IVSC), (2021) and the Royal Institute of Chartered Surveyors (RICS), (2019) encourage the adherence to state legal guidelines when valuation practitioners are carrying out statutory valuations such as valuation for compensation and rental determination on rural land.

Legal and institutional framework for rural land management and valuation in Zimbabwe

Like in any other African country, land in Zimbabwe is held under various tenure systems. Basically, there are four forms of land tenure which are freehold, leasehold, statutory and customary. The freehold, leasehold and statutory exists both in urban areas and rural areas but the customary tenure is purely a rural land tenure arrangement. The tenure types in Zimbabwe are presented on Table 1 below;

Table 1: Tenure Systems in Zimbabwe

Item	Tenure System	Provided Rights
1	Freehold Tenure	Land is held and used under a title deed which is registered at the Registry of Deeds.
2	Leasehold Tenure	Land is occupied and used under a lease agreement between the state and the lessor. Leases are both short term and long term. Long term leases, from 10 years and above are registrable at the Registry of Deeds. The lease is managed by the state conferring user rights to the lessee under conditions.
3	Statutory Tenure	State land is used under certain statutory regulations. All permits, conservancy permits as well as licenses in National Parks and National Forests falls under this category.
4	Customary Tenure	Land is occupied and used under the authority of the traditional leaders on condition of tribal lineage.

Sources: Adapted from Kadenge and Chavunduka (2019)

Rural land management and valuation in Zimbabwe are guided by various policies, legal precepts and institutional arrangements. These include the Constitution of Zimbabwe Amendment (No. 20) Act, 2013, Land Commission Act (20:29), Land Acquisition Act (20:10), Communal Land Act (20:04), Rural District Councils Act (29:13), Traditional Leaders Act (29:17), Deeds Registry Act (20:05), Environmental Management Act (20:27), Regional Town and Country Planning Act (29:12), Communal Land Forest Produce Act (19:04), Forest Act (19:05), Land Surveyors Act (27:06), Valuers Act (27:18) and the Statutory Instrument 53 of 2014 Agricultural Land Settlement (Permit Terms and Conditions) Regulations, 2014. Kadenge and Chavunduka (2019) presumed that the multiplicity of arms of government in land management issues at different stages of governance are the most probable causes of land management inefficiencies among other challenges such as incoherent land policy, incapacity and duplication of duties. Legal and institutional provisions for rural land management and valuation are presented on Table 2 below;

Table 2: Legal and Institutional Framework for Rural Land Management and Valuation

<i>Legal Provision</i>	<i>Administering Authority</i>	<i>Related Rural Land Management and Land Valuation Aspects</i>
<i>Constitution of Zimbabwe Amendment (No. 20) Act, 2013</i>	Central Government	Provides for expropriation of rural land for public use
<i>Land Commission Act (20:29)</i>	Minister responsible for Lands	The act provides for the acquisition and disposal of rural land. It ensures equitable distribution of land and control of state land leasing for agriculture and other purposes.
<i>Communal Land Act (20:04)</i>	Minister responsible for Local Government	The act deals with a specific type of rural land in Zimbabwe called communal land. It provides for permit issuance for communal land use or occupation. It can set aside land for certain purposes. It also provides for compensation of the deprived due to land dispossession.
<i>Rural District Councils Act (29:13)</i>	Minister responsible for Local Government	The act classifies rural land, promote and control rural land development and impose land development levies on rural land owners or users.
<i>Traditional Leaders Act (29:17)</i>	Minister responsible for Local Government	The act provides for the issue of village registration certificates and settlement permits in rural land, prevention of unauthorised rural land use or settlement, ensuring conservation of rural land and related resources and presiding over rural land related dispute resolution processes.
<i>Land Acquisition Act (20:10)</i>	Minister responsible for Lands	The act empowers the Head of State and other state institutions to expropriate rural land for public good and to make provision for the compensation payable for agricultural land required for resettlement purposes. It also informs on the rural land valuation processes and methodologies.
<i>Deeds Registry Act (20:05)</i>	Minister responsible for Justice Legal and Parliamentary Affairs	The act establishes the Registrar of Deeds who is responsible for lease, freehold and servitudes registration.

<i>Environmental Management Act (20:27)</i>	Minister responsible for Environment and Tourism	It prohibits rural land degradation, and promotes sustainable rural land management practices such as afforestation
<i>Regional Town and Country Planning Act (29:12)</i>	Minister responsible for Local Government	The act provides for the planning of regions, districts and local areas with the objective of conserving and improving the physical environment. It also provides for the acquisition of land as well regulating and controlling development in an area.
<i>Communal Land Forest Produce Act (19:04)</i>	Minister responsible for Environment and Tourism	The act regulates the exploitation of and protects forest produce within rural land. It also encourages and regulates the establishment of plantations within rural land.
<i>Forest Act (19:05)</i>	Minister responsible for Environment and Tourism	The act establishes a commission for the administration, control and management of state forests.
<i>Land Surveyors Act (27:06)</i>	Minister responsible for Lands	This is an administrative act that provides for registration and regulation of Land Surveyors who are responsible for the surveying and establishing of boundaries of all classes of rural land.
<i>Valuers Act (27:18)</i>	Minister responsible for Local Government	This is an administrative act that provides for registration and regulation of Land Valuers in Zimbabwe.
<i>Statutory Instrument 53 of 2014 Agricultural Land Settlement (Permit Terms and Conditions) Regulations, 2014</i>	Minister responsible for Lands	The statutory instrument provides for the allocation or agricultural rural land, issuance and management of agricultural rural land permits.

Sources: Authors' Construct (2023)

In Zimbabwe, rural land valuations are carried out for the purposes of land disposal, buying, rental determination, taxation and compensation after expropriation or forced displacement. Rural land valuation is provided for in the Constitution of Zimbabwe Amendment (No. 20) Act, 2013, Land Acquisition Act (20:10), with the Valuers Act (27:18) providing regulation of registered valuation practitioners. Both the basis and method of valuation are normally determined by the purpose of valuation. However, the Land Acquisition Act (20:10) seem to spell out the cost and investment approach based on fair (statutory) value basis, for valuation of rural land and related improvements. Of note is the separation of rural land into communal land and agricultural land by section 72 of the Constitution of Zimbabwe Amendment (No. 20) Act, 2013. Agricultural land is defined as a piece of agricultural land registered as a separate piece of land in a Deeds Registry whilst communal land is identified as land set aside and held in accordance with customary law by members of a community under the leadership of a Chief. Also, valuations of these different types of rural land are differentiated in the Land Acquisition Act (20:10).

Section 20 of the Land Acquisition Act (20:10) informs for the valuation of land that is not specially gazetted, which includes, communal land and other land forms and land uses that constitute rural land, however, it only spells out valuation for one purpose, thus, compensation. The act provides for the assessment of fair and reasonable compensable value using the cost approach as a method of first instance, with other methods of valuation to be used under special considerations. However, the act does not define the meaning of fair and reasonable value. On the other hand, section 29A, 29B and Schedule (29C and 50) of the Land Acquisition Act (20:10) spells out the land valuation process for the specially gazetted land, thus, agricultural land. Two methods of valuation which are the depreciated replacement cost and income approach are used. The income approach is used for the biological assets and the cost approach for land and other improvements. The act establishes a Compensation Committee which assesses and fixes fair value for compensation. Also, like in the fair and reasonable value, the act does not define what is fair value. Generally, the legal framework is sketchy on rural land valuation issues leaving much decisions to the valuation practitioners.

Methods

This study utilized secondary data through literature review approach. Existing literature in the form of journal articles, conference proceedings, dissertations, review articles, newspapers and handbooks were explored to find out the interconnectivity relationship of rural land management and rural land value. Legal and policy prescription was also sought through consulting of local rural land related laws and government statements as well as the best international recommendations. The study looked at the aspects of land management and minimally land valuation as perceived from other countries around the globe.

Findings and discussion

Document analysis was used in this study. Public and private documents, both physical and electronic were evaluated so as to decipher meaning and gain understanding. Evidence from

literature review strongly show the necessity for sustainable rural land management practices for rural land value improvement. Generally, rural land in Zimbabwe has economic value but also seem to hold high social value as natives treat it with cultural significance. This is expressed in Section 289, Clause (a) of the Constitution of Zimbabwe Amendment (No. 20) Act, 2013 which reads *“land is a finite natural resource that forms part of Zimbabweans’ common heritage.”* Its value transcends the economic value theory in relation to land value. The tone of the constitution corroborates with the notion that land is intrinsically valuable. Rural land in Zimbabwe is multifaceted as indicated by different rural land classes. This study found out that, rural land is classified into large scale commercial farms, small scale commercial farms, communal land, state land which comprise of national parks, national forests and any other land designated as such by an act of parliament. Also, Zimbabwean rural land is owned, used and managed under a hybrid of tenure system by different institutional arrangements. Rural land classes, tenure systems, legal provisions and perceived value of each is indicated on Table 3 below;

Table 3: Rural Land Classes, Tenure Systems and Perceived Value

Rural Land Class	Tenure System	Perceived Value	Number of Regulatory Acts	Number of Regulatory Institutions
Large Scale Commercial Farms	Freehold and Leasehold	Economic value, environmental value	8	4
Small Scale Commercial Farms	Freehold and Leasehold	Economic value, environmental value	8	4
State land	Leasehold and statutory permit	Economic value, environmental value	8	3
Communal Land	Customary and statutory permit	Cultural value, social value, economic value and economic value	8	2

Sources: Authors’ construct (2023)

It can be noted the table above that each rural land class falls under eight acts of parliament and at least two regulatory institutions with customarily held land being the one less regulated. Naturally, with a greater number of regulatory acts and being administered in different institutions, the risks of overlapping functions, duplication of duties and conflict are inevitable. This poses challenges and can result in weak land management practices which can be detrimental to land value. Usually, when problems institutions overlap and duplicate duties land disputes, land degradation, inequity and in access to land ensue. With unequal access to land, inequity and inequality evident, discontentment of citizens becomes a community trait which can lead to other social evils like corruption and even motivated crimes.

An example of regulatory conflict is seen in the Traditional Leaders Act (29:17) and the Communal Land Act (20:29). The Traditional Leaders Act (29:17) gives the traditional leaders authority to

issue of village registration certificates and settlement permits in rural land. Further, they are empowered to prevent unauthorized rural land use or settlement. It also gives them authority to prohibit rural land degradation as well as presiding over rural land disputes. On the other hand, the Communal Land Act (20:04) authorizes a district council to issue a permit rural land occupation and use. Whilst consultations are encouraged on both parties, but sometimes in practice it is not so. Such legal provisions create competition on rural land allocation resulting in double land allocations followed by rural land disputes and diminished rural land value.

Another evident rural land management conflict exists between the Land Commission Act (20:29), read together with Statutory Instrument 53 of 2014 Agricultural Land Settlement (Permit Terms and Conditions) Regulations, 2014 and Rural District Councils Act (29:13), read together with the Regional Town and Country Planning Act (29:12). The Land Commission Act (20:29), Land Acquisition Act (20:10) and the Statutory Instrument 53 of 2014 Agricultural Land Settlement (Permit Terms and Conditions) Regulations, 2014 are administered by the Minister responsible for Lands. These lands acts superintend agricultural land and issues permits and leases on all land within the specially gazetted areas. On the other hand, the Rural District Councils Act (29:13) and the Regional Town and Country Planning Act (29:12) are administered by the Minister responsible for Local Government. They also give rural its administrators authority to collect land rentals. These areas on the other hand falls within specified Rural District Councils, which are also authorized by the Rural District Council Act (29:13) to control land development as well as imposing land levies on land users. Need to collect revenue from the same land user creates unprofessional competition, burdens the land user, which in turn discourages land investment to the decline of rural land value.

On rural land valuations, the Zimbabwean laws seem to be wanting. The Communal Land Act (20:10) and the Land Commission Act (20:29) advise on the compensation after dispossession of rural land by the power of eminent domain and refers to the processes as laid down in the Land Acquisition Act (20:10). Of course, the Land Acquisition Act (20:10) has near spelt out valuation and compensation processes of rural land but they only relate to agricultural land, leaving other types of rural land. This creates a gap in land valuation systems. For the realization of rural land benefits, its land management and valuation systems must be all encompassing and well defined. When valuation systems and processes are informed and incorporates all stakeholders' concerns, all land values can be realized and benefited.

However, evidence from literature shows that, legal and institutional conflicts is not a Zimbabwean challenge only but most likely a global one, as indicated by study findings in Auzins, et.al., (2022) and Shoyama, (2020). In Zimbabwe, and Africa at large, the challenges are precipitated by multiple tenure systems, political interference and tenure insecurity (Kadenge and Chavunduka, 2019). Whilst land management is a global challenge, it presents demands cooperation at an international level which is an opportunity for building partnerships. Experiences of the Covid 19 pandemic show that, when people are faced with a common tragedy, they tend to work together for the imminent achievement of sustainable goals.

Conclusion and recommendations

Rural land in Zimbabwe is a major factor in the country's economic, social and cultural progress. The majority of the Zimbabwe's rural people have their lives mainly dependent on subsistence agriculture. Zimbabwe, as an agro-based economy, has rural land contributing immensely to its Gross Domestic Product (GDP). This means that, rural land, its management and valuation should be topical on national strategy. Research showed that, rural land management in Zimbabwe is complicated and weak. Poor rural land management practices and undefined valuation processes often lead to land degradation, land related disputes and discourage socio-economic development opportunities. Furthermore, population growth and less employment has caused more pressure on rural land, which is a recipe of corruption considering the many regulatory interests.

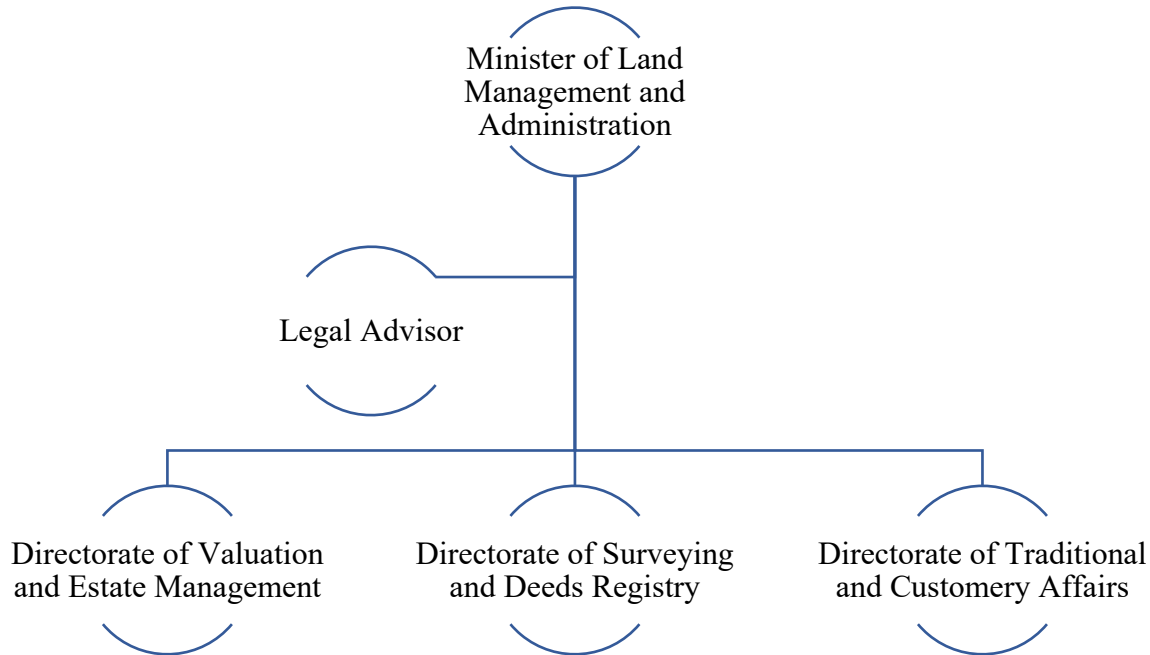
In light of the above, a pragmatic and complementary approach in policy is required. With an optimal policy framework which recognizes and financially supports rural land rights, coupled with the right technological interventions, rural land can improve the face. There will be a possibility of increased urban-rural migration, thereby reducing pressure on urban land and increasing investment in rural land. This can result in increased rural land values as well as increased government revenue through taxes. In an effort to achieve such, this article recommends the following;

a) Recommend an all stakeholder relook on rural land management and valuation model

First, there is need for a comprehensive evaluation of the current legal and institutional framework for rural land management and valuation in Zimbabwe. This will expose the weaknesses and shed light on the opportunities presented by the current rural land management model. Based on that, a foundation for an optimal rural land management model can be laid, taking into consideration the cultural, social, economic, political and technological factors as well as different current rural land stakeholders' goals. This can create a model that has the potential of satisfying general public and private goals without diminishing land value.

b) Recommend for an all-inclusive land policy

An explicit and all-inclusive land policy is long overdue in Zimbabwe. The policy should include clearly defined terms, concepts and parameters on issues of land management and valuation. The document should harmonize scattered land management and valuation acts and amalgamates the institutions that are responsible for the land management and valuation. If possible, all land administrative departments should fall under one authority for efficient execution of duties and eradication of duplication of duties and overlapping responsibilities. An example of the structure could be like below;



The Directorate for Valuation and Estate Management will be responsible for all rural land valuations and management issues like lease processing, issuance and revenue collection. The Surveying and Deeds Registry Directorate will be responsible for the surveying of all land and registration of long-term leases and titles. Liaison with the Traditional and Customary Affairs Directorate would help for the easy management of customary land. All this will be under the leadership of a minister and guidance of a legal advisor.

c) Recommend land valorization

Land valorization is an economic and legal tool of objectively assign a monetary value to rural land, which will enable an unbiased economic valuation of rural land. Based on that unbiased economic valuation, rural land may be securitized and serve as collateral for borrowing from financial institutions. This can create a robust rural land market which allows free exchange of land interests in the open market with less government control. Also, there is potential of increased revenue collection through imposing of transfer fees on rural land.

d) Recommend land value capture

Land value capture is a deliberate public action undertaken by either the government or a private entity with the objective of increasing land value and public benefits. It is the outcome of four elements. First, a public action that causes an appreciation in land value. Second, implementation of a valuation model that recognizes the land value increase. Third, levying of tax that captures the increased land value and fourth, revenue collection taking into account increase in land value. The land value capture has been advocated for in the context of urban land management. The same concept can be tried in the rural Zimbabwe on a piecemeal approach. It can be done through such policies like devolution, strategic rural land management and incentivizing rural investment by local and foreign investors.

Notes on Contributors

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The effect of space flexibility and building orientation on grade-B office building occupancy rate in Kampala City

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Abstract

This paper focused on linking the influence of the specifics of building services orientation and space flexibility on the occupancy dynamics of Grade-B office buildings.

The paper employed a cross-sectional design, backed with qualitative and quantitative research approaches, on a sample size of 115 respondents including tenants (70), property managers/owners (40), and real estate experts (05). Data collection was through questionnaires and interview guides. Quantitative analysis was done through univariate and bivariate methods buttressed by the use of MS Excel, MS. Word and STATA version 15. The qualitative component employed thematic analysis.

The findings indicate a significant relationship between occupancy length and the sufficiency of rentable space to meet business needs. Buildings with bigger rentable spaces had higher occupancy. Lastly, the majority (82.9%) of the tenants could not customize their rentable spaces according to their needs due to restrictions from landlords and property managers, leading to their high mobility. We recommend attention to the design and layout of parking spaces commensurate to the building's capacity and local regulations and ensuring flexibility of floor plans during building designs. A well-designed building with convenient road accessibility, ample parking, attractive amenities, and tenant-focused design can better retain tenants, leading to better building performance.

Keywords: office blocks; building orientation; design; occupancy rate

Introduction

Globally, building orientations and service provision of the buildings are fundamental aspects to consider in sustaining occupancies. Orientation and building views are often considered as an “iconic edifice” that always beautify the skyline of cities and play a significant role in the economic growth of urban centres (Akhimien et al., 2017). Such aspects of the building view, directly impact on the business transacted by the occupants as they determine the convenience of both the tenants and business clients. Eventually, they will have a direct influence on the return on investment.

Over the recent past, the Kampala CBD has faced a reduction in the number of inquiries and interest in office space for letting particularly for grade-B office spaces (Knightfrank, 2021, Mubiru and Naturinda, 2023a). This led to a 3% drop in occupancy of Grade-B office buildings from 84% in H1 2020 to 81% in H1 2021. Grade-B office buildings often face challenges in maintaining high occupancy rates due to the competition from newer, more modern and better located buildings (Block, 2011). One factor that may contribute to lower occupancy rates is the building orientation, which can affect the indoor environment, energy efficiency, accessibility, manoeuvring, and overall appeal of the building. However, there is limited research on the specific effects of building orientation on occupancy rates of Grade-B office buildings.

Current studies have focused on the impact of building orientation on energy efficiency, thermal comfort, lighting, performance and ventilation (Aini and Nadia, 2019, Gonçalves et al., 2021,

Kaminska, 2020). Additionally, Choi and Storr (2019) identified a relationship between rent increase and tenant retention in commercial real estate. The authors, however, did not cover an in-depth analysis and correlation of particular building orientation variables on building occupancy, especially in the context of Kampala city. Therefore, this study aims to investigate the effect of building orientation on occupancy performance of Grade-B office buildings. This is with a view to providing insights into how building design can impact the market performance of these buildings. Such performance can likely be achieved through sustained occupancy arising from the fit for purpose spaces and flexible occupancies.

In addition to the paper aim, several lines of assumption were adopted. These include there is no significant association between the length of stay and the flexibility of rentable space; There is no significant association between occupancy length and access systems to the building; There is no significant association between occupancy length and whether it is difficult or not to access the building from the main road; and, there is no significant association between occupancy length and availability of parking space.

Building orientation and flexibility occupation of Grade-B Office Space -a theoretical perspective

The understanding of the concept of building orientation is multi-faceted. Building Orientation means the way a building is positioned or sited in respect to its surroundings (Gehl, 2011), and may be referred to as front-to-front, where the primary façade faces the primary façade of an adjacent building, or side-to-side or back-to-back (Shepperson, 2009, Al-Temeemi, 1995). In this way, it comprises the arrangement of different parts of a building in a specific direction so as to maximize certain aspects of its surroundings. Such aspects may include street appeal (Carmona et al., 2018), capturing scenic views (Sullivan and Meyer, 2016), or for drainage considerations (Schmitt et al., 2004) among others. Building orientation may further incorporate the layout/size of the rentable space (Kendall and Teicher, 2010), accessibility from the road (Martínez and Viegas, 2009), flexibility of the rentable spaces (Khamkanya and Sloan, 2009, Vimpari et al., 2014), accessibility within the different parts of the building (Mubiru and Naturinda, 2023a), and size/capacity of parking spaces to offer tenants for increased satisfaction and productivity.

Segmenting into building orientation of office buildings is important for this paper that emphasizes the occupancy performance of buildings. This is because orientation components of buildings have links in influencing occupant satisfaction, willingness to pay and tenancy renewals. The designs and orientations of office buildings can be determined by a number of speculative and corporate factors by individuals and firms predicted to be future tenants (Duarte et al., 2013). The orientations are thus determined by user type, such as investment banks, professional firms, or high-tech companies who normally dictate the floor size, concept and marketable location of the building (Kohn and Katz, 2002).

Occupancy performance, especially for office buildings can manifest in various forms. For instance, it can be determined by vacancy rates. This signifies the number of dwelling units which are vacant on a specified date expressed as a percentage of all units standing on that date (Pedersen and Delgadillo, 2007, Theobald, 2001). Basing on the preceding thus, the length of occupancy will signify the amount of time that a certain tenant occupies a given office space. Such a period commences when a unit gets occupied by a tenant and ends when the room becomes vacant (either

because an occupant moves out of an existing unit or because the unit enters the market). Vacant rooms are unoccupied units available for rent (Schmitt, 2000).

The quality of Grade-B office buildings is slightly lower than that of Grade-A. Such spaces are occupied by companies and organizations that seek offices in a quality building but are unable or unwilling to pay high rental rates charged by Grade-A offices. The common factor contributing to a building being considered Grade-B is its age (Dermisi and McDonald, 2010). Grade-B office buildings are thus usually older than their Grade-A counterparts. Oftentimes, a Grade-B office building was originally Grade-A but has been downgraded due to age and deterioration. These properties typically have good amenities, management companies and tenants, and can even be brought up to Grade-A standards with common area renovations and amenity upgrades and rental rates for Grade-B buildings lower than Grade-A. The buildings themselves are usually considered average, and the rental rates they draw are average for their markets (BOMA, 2022, Case and Shiller, 2003).

Generally, Grade-B offices are a grade below Grade-A, and slightly older buildings than Grade-A with good management, quality tenants, good building finishes, good quality systems (not at Grade-A level). They are often well maintained with average rental rates and usually targeted by occupants planning renovations to restore them to Grade-A. The distinguishing factor between a Grade-A and grade-B building is the quality and variety of amenities and building finishes (Katz and Gupta, 2014). These office spaces compete for a wide range of users that want average rental rates for their market areas (Peltier, 2001). Tenants who occupy Grade-B buildings don't need to be in the middle of the action, nor do they require an outward display of prestige. Instead, they want to provide employees with a comfortable, modern workspace. Typical tenants include companies that value function over form, and are in fields like IT, creative services, and call centres.

To fit a Grade-B office definition, amenities would need to include, but aren't limited to on-site parking, security, conference rooms, bike storage, cafeteria-style or café dining, and shared outdoor spaces. Thus, improving the workplace quality, security, flexibility of space and cheap ample parking space are important for lengthy occupancy periods and more tenancy renewals (King et al., 2017).

Literature Review

The issue of flexibility of building orientation, energy consumption, sustenance of occupancy trends and tenant satisfaction have attracted considerable attention from scholars over the last ten years. A study by Kim. (2021) investigated the impact of building orientation on the energy consumption and occupancy rates of commercial buildings in Seoul, South Korea. Similar experiences have been observed in Italy (Bellia et al., 2013), Hongkong (Leng et al., 2020), and some sub-Saharan African cities (Nematchoua et al., 2020). In this way, commonly the buildings with adequate orientation to natural ventilation and shading likely claim lower energy consumption and improved indoor environmental quality. Eventually, if such expectations are met, it leads to increased tenant satisfaction and higher occupancy rates. Similarly, Geng et al. (2019) and Zuhaib et al. (2018) indicated that buildings with good orientation to natural ventilation, shading, and daylight had better indoor environmental quality and occupant satisfaction. Such would impact on increasing tenant retention and higher occupancy rates and the other way round.

Whatever its size or type, the office building is a complex building type and is affected by many forces. Such forces can eventually impact on the quality of its occupancy based on how the occupants perceive the flexibility of the provided spaces. Akhimien et al. (2017) noted that the important role of the office is to provide accommodation for tenants, visitors and equipment, at same time facilitating office activities. As such, the design and orientation of the office has a great effect on the fulfilment of the building's primary performance expectation.

The need for office buildings to have more flexible spaces, adaptable office equipment and materials, built in services etc. is beginning to be a standard practice in the tropics and in developing countries. This is because the electricity often may not be constant and sufficient to run most office buildings. Therefore, the need to make office building design environmentally friendly is highly emphasized with the provision of alternate lighting solutions, proper ventilation system in buildings in case of power outage, incorporating open-office plans for increased office space flexibility (Zhang et al., 2013).

A study by Belafi et al. (2021) investigated the impact of building orientation on the sustenance of occupancy performance of commercial buildings in hot climates. The study found that buildings with good orientation to natural light and ventilation had higher and sustained occupancy rates and lower energy consumption, as well as improved indoor environmental quality. The study noted that building orientation was particularly important in hot climates, where cooling loads can be high. Similar sentiments were observed in China (Miao et al., 2020).

Baum and Crosby (2019) studied the determinants of lease length in commercial property markets and found that tenant characteristics, lease terms, and property characteristics are significant factors. Furthermore, the longer leases are more likely to be signed by tenants with higher credit ratings and firms with longer operating histories (Giambona et al., 2008). Additionally, shorter leases are more common in properties with higher vacancy rates and in locations with weaker economic conditions. This suggests that property managers should consider the factors that influence lease length in order to maximize occupancy performance.

On the other hand, Gujral et al. (2020) indicated that the length of leases with high-quality tenants can determine the value of commercial real estate and provide a stable source of rental income. However, it is important to note that, shorter leases with high-quality tenants can provide flexibility and allow for rent increases when market conditions stabilize. These views suggest that property managers should carefully consider lease structure in order to maximize occupancy performance. Such sentiments are shared also by Devine and Kok (2015) who observes that, tenants are more likely to renew their leases if they have greater control over the design of their space and if the lease terms are flexible. These findings suggest that property managers should consider allowing for flexible lease terms in order to retain tenants and maximize occupancy performance.

Considering tenant turnovers, and satisfaction, several scholars have attributed them to several factors. James III (2007) has hinged satisfaction to the performance of the building and its amenities. In this way, building quality, accessibility, and property management are significant factors in tenant satisfaction and retention. Additionally, Mubiru and Naturinda (2021) hinged satisfaction to the level of complaint responses by the landlords, whereas Mubiru and Naturinda (2023b) connect this to the distribution and quality of access systems in the buildings.

Existing literature on commercial property occupancy in Uganda has correlated the length of tenancies and possible negotiations. Deininger and Castagnini (2006) indicates that, in Kampala, the average length of tenancy in commercial properties is approximately 2.5 years. Additionally, it is possible for tenants who have been in buildings for longer than 3 years to be more likely to negotiate for lower rent or better lease terms. This suggests that longer lengths of occupancy may lead to increased bargaining power for tenants. Additionally, tenants prioritize factors such as location, accessibility, and security when choosing a rental space (Haraldsson and Håkansson, 2023) especially for office properties. However, the authors so far have not analysed deeply how the occupancy and the choices of the tenants to sustain and renew their tenancies are pushed by the orientation attributes and layout flexibility of the Grade-B offices.

Therefore, the flexibility of space can have a significant impact on the occupancy rates of office buildings. Flexibility allows for the efficient use of space and can accommodate changing tenant needs and preferences, leading to increased tenant satisfaction and improved occupancy rates. The flexibility of buildings may come in different forms. These include building views regarding the main access routes, location of access systems, distribution and capacity of parking space, accessibility and distribution of the working spaces, and the general adjustment in cases of possible changes in use. The flexibility in design, including the ability to accommodate remote working and social distancing, could increase tenant satisfaction and lead to higher and sustained occupancy rates (Hassanain et al., 2018). On the other hand, buildings with inflexible designs could suffer from decreased demand and lower occupancy rates.

Key lessons have been gathered from the reviewed literature that form a basis for study of this paper's aim, issue and variables in the context of Kampala city. The literature reviewed has emphasised the committing to longer leases as a key ingredient for Grade-B office buildings' performance. Thus, property managers should carefully consider lease structure to maximise occupancy performance.

Methods

This paper employed a cross-sectional research design, with aid of a mixture of qualitative and quantitative approaches of descriptive statistics. A cross-sectional study is a type of observational study that analyses data from a population, or a representative subset, at a specific point in time (Lee and Chia, 1994). Thus, cross-sectional designs are used in preliminary and exploratory studies to allow researchers to gather information, summarize, present and interpret for the purpose of clarification (Kothari, 2019). The researchers adopted this research design because this study fits within the provisions of descriptive cross-sectional research designs, and yet, the study seeks to collect data at a given point in time, summarize it, present and interpret findings to answer a specific research aim. The study was conducted using primary data obtained from study participants through objective human observation, experiences shared through interviews and served questionnaires. Furthermore, and guided by secondary data concerning property occupancy statistics and price patterns obtained from property management companies' reports, Uganda Bureau of Statistics (UBOS) reports, among other reliable sources to make valid inferences.

For purposes of this paper, the main target respondents were the sitting tenants/occupants and property managers of Grade-B offices, at Luwum street- Kampala city. The focus area of this study

was, Grade-B office spaces along Luwum Street, Kampala city. The selection of the case study area was majorly based on the existence of a sufficient number of Grade-B office buildings, especially those that are professionally managed. Luwum Street is located in the central division of the Kampala capital city authority. It spots a variety of commercial high-rise buildings, many of which boasted of the attributes that were relevant for this study. For instance, the linear patterns along access routes and their orderly sequence helped selection through a systematic sampling.

In addition to observation, the tools used for data collection were questionnaires and structured interviews for the tenants and property managers/building owners respectively. The in-depth interviews were used to supplement the data collection from real estate experts who comprised the key informant respondents. The questionnaires were pre-tested on a sample of 10 respondents selected from three selected grade B offices in the study area, using convenience sampling. In this, the validity was measured using the Content Validity Index method to indicate the degree to which the questionnaire corresponds to the concept it is designed to measure. Content Validity Index was determined using the formula below:

$$CVI = K/N.$$

Where, **CVI** = Content Validity Index, **K** = Number of questions considered relevant/ suitable, **N** = Total number of questions.

Rejection Criteria

Reject the instrument is $CVI \leq 0.5$. If CVI is greater than or equal to 0.5, the items in the instrument at acceptable level of significance was accepted (Lawshe, 1975). The Cronbach's alpha was used to determine the internal consistence (Cronbach, 1951).

Sampling strategy

A systematic sampling technique was pivotal in aiding the selection of the sample buildings. The office buildings along Luwum street in Kampala central Division had a consistent distribution pattern. The buildings' distribution along the Luwum street and others in defined patterns behind the main tributaries, yet with no significantly divergent patterns made the selection through systematic sampling relevant. The selection was made for every third high-rise office building along the Luwum street stretch. Eventually, seven (07) buildings were selected, and from each ten (10) tenants purposively selected. Purposive sampling was also used in selecting the key informants who included seven (07) property managers or landlords managing the sampled buildings. The choice between property managers and/or landlords depended on who was willing to respond to the study questions and their ability to elaborate management dynamics of the managed buildings. Finally, thirty-eight (38) other real estate professionals, including real estate agents and valuers were also selected for interview. These were purposively selected for possessing important knowledge of the Kampala property market and sharing their experience regarding how the buildings' orientations have influenced the occupancy trends and the property market.

Table 1: Sample Distribution

Category	Sample size	Information needed
Tenants	70	Building design, tenancy renewal prospects, inclusivity of the lettable space.
Property experts	38	Inclusivity of the orientation design
Property Managers/Landlords	07	Tenant turnovers Preferences of certain building portions Complaints on space allocation

Source: Authors' construct, (2023)

The target population comprised of 115 participants that combined 70 tenants (ten from each of the seven sampled buildings), 07 landlords /property managers and 38 property experts (Table 1). Seventy (70) structured questionnaires were administered with tenants, and the responses from landlords /property managers and the real estate experts were gathered through structured and in-depth interviews. During selection, we ensured that a respondent was picked on different floors to limit the monotony of responses and experiences, given the differing means in which occupants appreciate the services provided by the buildings.

Data analysis

Data from questionnaires was entered using Microsoft Office Excel from where it was cleaned and coded. The clean data was exported to STATA Version 15 from which analysis was done. The univariate data analysis provided by descriptive statistics presented using frequency tables, bar graphs and pie charts. Data was also analysed through bivariate analysis. This is analysis of two variables at a time to establish any relationships/associations. This was presented using two-way tables (cross-tabulations) for two categorical variables, correlation analysis for two continuous variables and Analysis of variance (ANOVA) for cases where one variable is continuous and the other is categorical. ANOVA tests for equality of means. The testing of the hypothesis further followed a one-tail test. Confidentiality was maintained to protect the respondents. Furthermore, the questionnaire didn't disclose details of rental property for the issue of privacy and secrecy.

Findings

This paper aimed to analyse how space flexibility and building orientation play a key role in sustaining occupancy of Grade-B office buildings. The analysed data in this section exhibits the various experiences of the occupants, those in charge of the buildings and from the property experts in Kampala city regarding the study aim and variables. The findings of this paper are thematically categorised into four sections. These include accessibility and manoeuvring within the buildings, Access from the road, Size of rental space, Parking space, Flexibility of space.

Descriptive Statistics for rentable space, parking space and occupancy performance

The study compiled descriptive statistics for the quantitative variables of 07 property managers interviewed and presented in Table 2 below.

Table 2: Statistics for rentable space, parking space and occupancy performance

Variable	Mean	Std. Dev.	Min	Max
Occupancy rate	27.1	22.3	4.2	100
Total Size of rentable space	668.6	293.2	159	1169
Number of parking spaces	95.5	53.6	24	199
Number of floors	4.2	1.8	2	8
Number of rooms	15.3	6.3	6	28
Number of vacant rooms	3.4	1.8	1	6
Average length of occupancy	5	2.1	1	8
Average rental income	1,420,000	368,856.88	850,000	2,500,000

Source: Author Construct, (2023)

From Table 2, average occupancy rate of the sampled buildings stood at 27.1% with a standard deviation of 22.3 while the lowest occupancy rate was 4.2, and the highest occupancy rate was 100%. The average rental income is Uganda shillings 1,420,000 (USD. 379), where the most expensive rental space is Uganda shillings 2,500,000 (USD. 667), while the cheapest room is Uganda shillings 850,000 (USD. 227). The average rental size is 668.6 square feet with a standard deviation of 293.2sqft, the smallest office space is 159 square feet while the biggest is 1169 square feet. Also, the average number of parking spaces is 95 vehicle spaces with the smallest accommodating 24 vehicles while the biggest accommodating 199 vehicles. The parking spaces include both underground parking, open space parking and rooftop parking spaces.

On average, every building had 4 floors and 15 rooms with the shortest and biggest buildings having 2 floors and 28 rooms respectively. Furthermore, the average number of vacant rooms per building is approximately 3 rooms with the highest number of vacant rooms being 6 rooms. The average length of occupancy is 5 years. Some tenants have stayed as short a minimum of 1 year while some other have been tenants for 8 years.

Accessibility and manoeuvring within the buildings.

The type, location and distribution of the different access systems are key ingredients in the orientation attributes of high-rise office buildings. Such vertical access systems may include stairs, lifts/elevators and ramps. They are key in determining the tenants' occupancy of the premises, as their locational orientations in a way is likely to influence tenant comfort and sustained occupancy (Mubiru and Naturinda, 2021). For this reason, tenants were asked the type of access systems that the buildings they occupied had and their responses are as shown in Figure 1 below.

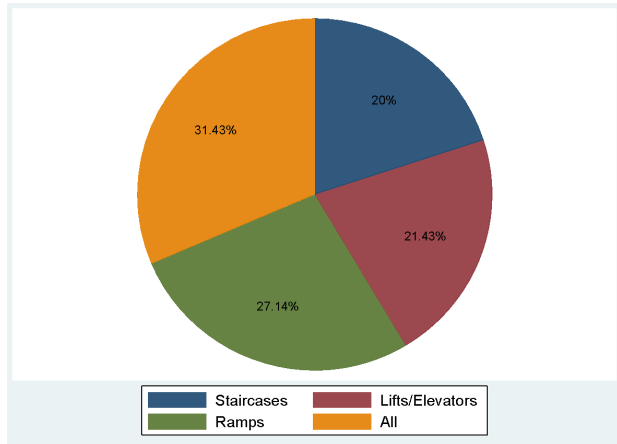


Figure 1: Type of access system.

Source: Authors' survey, 2023

In addition to the illustrated statistics in Figure 1, the tenants' perceptions were driven by the actual locations of the buildings' access systems, as such influenced their comfort in their stay. From the statistics gathered, 70% of the tenants were mindful of the locational distribution of the access systems and they would be key to their sustained occupancy. Such sentiments were shared by (Abisuga et al., 2020) who further indicated that such tenant expectations can be sorted by post-occupancy feedback which may at times necessitate reorientation of such systems to ease comfortable access.

Length of occupancy and plans to renew tenancies

The current length of building occupancy, and the intention of the tenants to renew their tenancies/occupancy are fundamental to note in this study. Such components would signal the tenant satisfaction with the different aspects of the building (Mohd Nor et al., 2020, Mubiru and Naturinda, 2023a), including the orientation and facility distribution of the office premises.

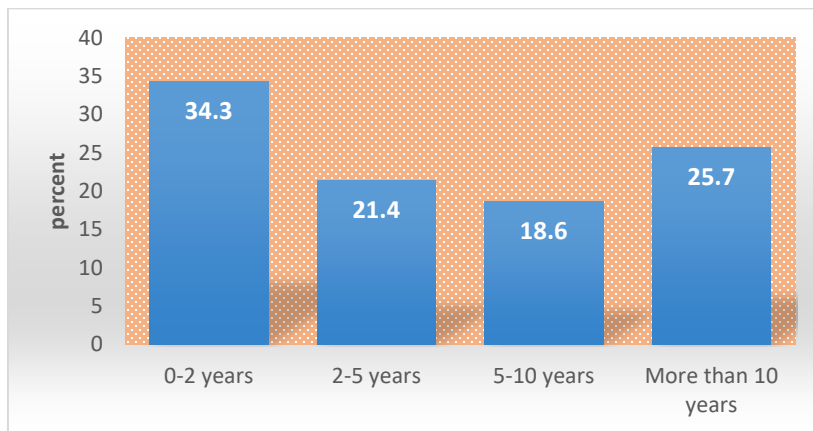


Figure 2: Tenants' length of occupancy

Upon inquiry from the tenants as per their length of stay, the results established varying tenancies and intentions for stay. Most of the tenants (34.3%) occupied their spaces between 0-2 years

followed by those who had occupied their current office spaces for a period of more than 10 years with 25.7%. When asked how long more the tenants planned to occupy their rentable space in the building, most of the tenants (32.9%) indicated that they are planning to remain in the current buildings for a period of between 0-2 years. The least number of tenants (10) representing 14.3% only planned to spend more than 10 years in their current spaces.

In addition, the findings revealed that the majority of the tenants (60%) were not willing to renew their tenancy agreements upon expiration of their current terms. However, the tenants noted that if given incentives like parking fee reductions, free toilet facilities for their clients, freedom to customize their spaces, enough parking spaces, and extensions in rent arrears, they could get encouraged to renew their tenancy agreements.

Influence of orientation of access systems on the occupancy rates The study analyzed the length of occupancy against the orientation of access systems and the accessibility of the buildings, to establish whether there were any relationships. Cross tabulation was conducted where the two variables under comparison were both categorical and a two-way table with measures of association was given as the out and interpreted to reject or accept the null hypothesis of no association. In cases where one of the two variables under investigation was quantitative against occupancy length, an analysis of variance was conducted to compare means of the different factor variables and presented in ANOVA tables.

For tenant continued stay in the Grade-B office buildings, continued manoeuvrability had to be ensured for all types of users. What remained unclear, in the context of Kampala city was whether the particular orientation of the internal access systems would influence tenant sustained occupancy. The results are presented in Table 2, and interpreted in the section below.

Table 3: Cross-tabulation of occupancy rates and orientation of access systems to the building.

Occupancy length	Orientation of access systems to the building					
	Ramps	Staircases	Lifts/Elevators	All	Total	
0-2 years	3	8	1	9	21	Prob = 0.0183
2-5 years	6	2	8	2	18	
5-10 years	3	3	3	6	15	
More than 10 years	7	1	3	5	16	
Total	19	14	15	22	70	

Source: Author Construct, (2023)

The probability value of 0.0183 is significant at 5% level of significance. This implies that there is a significant association between length of occupancy and the distribution/orientation of access systems to the office buildings. This implies that the nature or type of access system in place such as ramps, staircases, lifts or elevators may not suffice. For user satisfaction evidenced in

committing to longer occupancy, the distribution/orientation of the internal vertical access systems was key. This observation with Adnan and Daud (2010) in Kuala Lumpur city and Appel-Meulenbroek (2008) in Eindhoven.

However, in addition to the accessibility orientation within the buildings, the orientation and accessibility in terms of the main road was a key point to consider with potential of influencing tenant occupancy sustainability of the Grade-B offices. As Table 4 illustrates, its influence deviated from the earlier influence of in-building access systems.

Table 4: Influence of difficulties accessing the building from the road on the occupancy length

Occupancy length	Difficulties accessing the building		
	NO	YES	Total
0-2 years	12	9	21
2-5 years	9	9	18
5-10 years	9	6	15
More than 10 years	7	9	16
Total	37	33	70

Prob = 0.7883

Source: Author Construct, (2023)

From the output in Table 4, the probability value of 0.788 led to the acceptance of the null hypothesis. Therefore, no association was found to exist between length of occupancy and difficulties in accessing the building from the main road. This observation is a deviation from the observation for in-building accessibility systems. Implying that whether it was difficult to access the building, this did not influence the length of occupancy reported by the tenants. Studies which had found a significant correlation were linked to retail, commercial and residential properties (Hamer, 2018, Ibem et al., 2015, Nourian et al., 2018).

Occupancy rates and flexibility of rentable space

For office and commercial use of the Grade-B office buildings, many users desire flexible workspaces. This study thus considered flexibility as a key component of building orientation as illustrated in Table 5.

Table 5: whether the flexibility of the lettable space influenced tenant occupancy

Occupancy length	Have you been able to customize your space according to your needs		
	NO	YES	Total
0-2 years	21	2	23
2-5 years	12	6	18
5-10 years	3	9	12
More than 10 years	3	14	17
Total	39	31	70

Source: Author Construct, (2023)

The data found a significant association between length of occupancy and flexibility of rentable space. This is because the p-value of 0.0264 is less than the p-value associated with the 5% level of significance that led to the rejection of the null hypothesis of no association. Furthermore, it was apparent from the responses obtained from property managers that flexibility to reorient the spaces was often embedded in the tenancy agreements and largely depended on the amount of space and length of tenancy one was negotiating for. Eventually, tenants with bigger spaces enjoyed more allowance to reorient their space, guaranteeing their comfort and intention to stay longer in the let premises. This observation is compliant with that of Antunes Batista da Silva et al. (2022) who linked it with rent sustainability and Halvitigali et al. (2019) who linked it with encouragement of co-working.

Furthermore, from the interviews held, 62.5% of the managers indicated plans to make rentable space more flexible while, 52.5% of the property managers have restrictions on how tenants can use the rentable space available and provide incentives to their tenants in form of allowances for modification of their rooms for tenants who sign longer leases. On the other hand, 47.5% did not have any restrictions on how tenants should use their spaces and do not provide any benefits or incentives. Most of the managers have plans to change length of occupancy terms (55%) while 45% of the managers do not have plans to change the length of occupancy terms in the future. All in all, the flexibility and planning flexible spaces was more assured where property managers/landlords were responsive to the needs of the current and prospective tenants.

The Occupancy length vs the size and distribution of parking space

The building accommodation of the parking for all types of users was a fundamental component which users hinged on the orientation components that eventually impact on tenant occupancy. The size, distribution and possibility of manoeuvrability are key sources of complaints from building users, and in a way may influence mobility of tenants (Audu et al., 2018, Adnan and Daud, 2010). So it was vital for this aspect of building orientation to be correlated and check its influence to building occupancy trends as illustrated in Table 6:

Table 6: Influence of orientation of parking spaces on occupancy length

Occupancy length	Is there parking space for your business needs, employees and clients		
	NO	YES	Total
0-2 years	13	8	21
2-5 years	10	8	18
5-10 years	4	11	15
More than 10 years	9	7	16
Total	36	34	70

Prob = 0.1811

Source: Author Construct, (2023)

The p-value of 0.1811 is not significant at 5% level of significance. Thus, we fail to reject the null hypothesis of no association. Therefore, there is no significant association between occupancy length and availability of parking space. Thus, much as there were occasional complaints from tenants as recorded by the property managers/landlords, they were often no sufficient to singly influence tenants' refusal to renew their tenancies.

The preceding notwithstanding, the property managers were asked whether there were any traffic concerns or challenges that their tenants face while accessing the buildings from the road, especially concerning manoeuvring through the space, lack of assurance of the available space, and sometimes total failure to obtain space. The study revealed that majority of the tenants (57.5%) face challenges while accessing the buildings from the access road. Majority (85%) of these property managers have parking spaces and the parking fee is part of the rent paid by tenants. While only 15% of the property managers charge a parking fee as a service charge over and above the rent paid.

Key Building orientation considerations to tenant sustainability by key informants

In addition to the tenant responses, this paper triangulated from the key informants especially property managers and real estate experts, weighing the four building orientation variables in their influence to tenant occupancy and sustainability. The four variables include road accessibility, parking space, access systems, parking space and flexibility of the working space (Table 8).

Table 8: Key Building orientation considerations to tenant sustainability by key informants

Building orientation indicator	Yes	No
Road accessibility	46.9%	53.1%
Parking space	53.9%	47.1%
Internal Access systems	100%	0
Flexibility of the working spaces	17.1%	82.9%
Average	55%	46%

Source: Author Construct, (2023)

From the key informant responses, internal building access systems were considered fundamental in influencing the tenant occupancies. This was followed by the parking space, road accessibility and lastly the flexibility of the working space. This implies that, the Grade-B office tenants prioritised the comfort of their immediate environment (inside the building) more than the external views and orientation. Furthermore, the flexibility of the working spaces were largely prioritised by long term tenants who also preferred to negotiate bigger spaces. Such types of tenants comprised the minority, and it was not an immediate priority for most of the Grade-B tenants. Therefore, much as sufficient literature advocates for better values from the adoption of flexible office spaces (De Paoli et al., 2013, Hassanain, 2006, Göçer et al., 2018), it remains a preserve for Grade-A blocks and rather still far-fetched for grade-B office blocks, especially in the context of Kampala city.

Conclusion

This paper has weighed the various building orientation attributes, and how they influence the occupancy trends of Grade-B office buildings, within the context of Kampala City-Uganda. The key focus attributes are the distribution of access systems, accessibility from the roads, flexibility of the lettable space, size, location and availability of parking space. From the findings, the average space occupied is 429.571 which is common for typical Grade-B office buildings occupants. Most buildings (31.4%) use staircases, ramps, lifts and elevators. There is a significant relationship between length of occupancy and access systems to the building implying that, the nature or type of access system in place such as ramps, staircases, lifts or elevators have an effect on the length of occupancy by tenants.

However, no association was found to exist between length of occupancy and difficulties in accessing the building from main road. Implying that the difficulty (if any) experienced in accessing the buildings, could not directly have an effect on the length of occupancy reported by the tenants, and their choice to stay or leave the premises.

Therefore, the influence of particular aspects of building orientation to the sustainability of Grade-B office building tenancies remains a debatable one. The degree to which each aspect/variable influences the comfort of tenants can be considered on a case-by-case basis. But the common denominator lies in the internal orientation attributes of the building, especially the access systems and the space sizes. Probably, it is because that is the space where the tenants spend most of their working time. For the external orientation attributes, much as they are not significant, their locations are normally associated with tenant and user complaints which for sustainability of occupancy rates, should not be ignored by the property managers/landlords. By carefully considering these factors during the design and planning stages, building owners and developers can optimize the building's attractiveness, convenience, and financial performance.

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**Peer Reviewed*

The impact of corporate governance & corporate social responsibility on SA-REITs performance

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Abstract

This paper employs a CGI Index formulated from KING III and IV report to examine the link between corporate performance and quality of corporate governance (CG) and corporate social responsibility (CSR) of SA-REITs listed on the Johannesburg Stock Exchange (JSE). The CGI index is created from King III and IV. The empirical investigation using multiple correspondence analysis (MCA) reveals that corporate governance (CG) practices have a positive influence on firm performances measured by (such as total share return and return on assets). The results imply CG influences the firm performance of SA-REITs. The CSR index is created from the King reports, also the MCA was used, and CSR will likely improve SA-REITs performance by 13%.

Key words: Corporate governance, Corporate social responsibility, REITs, Performance

Introduction

In the early 1900s corporate governance (CG) was introduced by ElGabasi (1900); Low (1920); and Berle and Means (1932); to better understand the functioning of the firms and corporates. Later, Shleifer and Vishny (1997) defined CG as the ways in which investors of corporations assure themselves of getting a return on their investment. It is clear the primary intent of an organisation is to increase its returns.

CG is one of the sort after areas of research globally, a recent review reported by Simons et. al. (2023). In emerging economies, several studies investigated CG and performance, some of these in Asia, for instance Cheung et. al. (2007); Cheng (2008) found that unitary board members consist of executive officers that have a set of rules on how to govern corporations, incorporating good CG is linked to firm financial performance, they found positive impact of CG on firm performance. In an African context, Ntim et. al. (2013) using South Africa (SA) as a laboratory, found that better governed corporations improved the performance of SA corporations significantly. These were CG and firm performance in general not industry specific and or mainly in finance.

This study investigates CG and corporate social responsibility (CSR) impact on SA Real Estate Investment Trusts (REITs) performance. Previously Ntim, (2013), Ntim et. al. (2012) stated that SA corporates are expected to be responsible citizens by giving back as per the Kings reports, they focused on King II. The present study investigates Kings III and IV reports. All SA corporates are expected to submit annual reports based on the latest King report that has more emphasis on disclosure policies annually since 2016. Previous work by Ali et. al. (2020) determined that CSR impacts performance of organisations positively, they adopted the agency theory. This paper

further complements past work in this area of research, there is no research that has investigated CG in this manner, considering the King reports focusing only on REITs.

Research on REITs and CG increased globally focusing on its relation to firm performance, these include studies by Bianco et. al. (2007) and Bauer et. al. (2010) and Lecomte and Ooi (2013). REITs are corporations that own, operate, or finance income-generating real estate. REITs own many types of commercial real estate, ranging from office and apartment buildings to warehouses, hospitals, shopping centres, hotels, and commercial buildings (Han and Liang,1995; Chan, Erickson, and Wang, 2003; Block, 2011). Before the creation of REITs investors could only purchase real estate from real properties only not from stock (Armstrong, 1962, Dockser, 1962, Chan, Erickson, and Wang, 2003, Rackham, 2020). REITs has been a top performing class in SA since 2013 till 2017, it came tops to equities and bonds (Ntuli and Akinsomi, 2017).

SA-REITs is the prominent real-estate investment in an emerging market like SA and is the only nation in the African region on FTSE /EPRA NAREIT (WFE, 2018). Foreign and local investors require more studies on SA REITs (Carten and Ferboyte, 2018) On average, SA REITs have around 30% of their investments offshore and approximately 30% to 40% of their earnings come from outside SA (JSE, 2019). In addition, REITs are important to the investor globally, as nearly 40 countries have Real Estate Investment Trusts (REITs) with a market capitalisation of approximately 1.7trillion US dollars in 2020, then in 2021 it was 1.6 trillion and on the 1st of February 2023 it went up to 2.5 trillion (FTSE EPRA/ NAREIT, 2023).

The evolution CG and SA framework

The SA CG framework is built in an arrangement of King reports that adopted the Anglo-American Toms and Wright (2005); Letza, Sun and Kirkbride (2004) and the United Kingdom (UK) Cadbury report Jones and Pollitt, 2004; Dahya and McConnell, 2007).

Table 1: King reports

<i>Item</i>	KING I	KING II	KING III	KING IV
<i>Inception</i>	1994	2002	2010	2016
<i>Changes</i>	After the end of apartheid, SA adopted the American and UK Corporate Governance framework	After the execution of the Employment Act of 1998, the King report was revised. This new report included new listing rules for listed corporations	After the changes made to the US and UK framework after the 2008 recession; After the birth of the new Companies Act of 1998, the changes to the report were made	Disclosure policies became compulsory for all corporate to report. Corporate social responsibility

The SA model was first introduced in 1994 as King I, later modified to King II in 2002 after the execution of the employment Act. After changes with Companies Act, the King III was introduced in 2010 and finally in December 2016 the last King IV was introduced when disclosure policy became compulsory.

The provisions unique to SA

The SA CG model is made up of 17 principles from the King-IV and 75 principles from the King III reports.

The effects of both *sequence of discrete data* and *cross-sectional* changes in CG index on corporate performance are considered, like Ntim (2013); Ntim and Soobaroyen (2013), Hussain, Rigoni and Orij (2018), Elamer, Ntim and Abdou (2020), however this study adopts a new approach where the indices are created for compliance on King III and IV reports for all REITs.

CSR

In 2017 all organisation listed on JSE had to comply with King IV that required all listed corporations to report on CSR and these reports had to be audited.

Adapted from the King IV these are the recommended practices each corporation should report on, there are four areas (i) Workplace, (ii) Economy, (ii) Society and (iv) environment. All organisations in SA are expected to comply with these to deliver citizens from social, economic, and environmental welfares (King IV, 2016).

SA-REITs

SA REITs now encompass of 5,8% of (JSE), the SA REITs market is liquid as of January 2023, the market capitalisation of 27 listed REITs as of the 1st of February 2023 is R549,22 billion (JSE, 2023).

Table 2 shows the top 5 listed REITs by market capitalisation. A REIT that is varied is essentially diversified, whereby it could be different sectors, for example residential combined with retail and many more. REITs are either internally (in house) or externally (outsourced) managed, all the top 5 REITs are managed internally. Outsourcing management is costly, this was proven by Sigrid (2017).

Table 2: Top 5 REITs as of January 2023

REITs	Focus	Size of Portfolio
Fortress-Income-FundLtd	Diversified	R16,6 bn

Growthpoint-Property-Fund	Diversified	R48,4 bn
Redefine-Properties-Ltd	Diversified: without residential	R27,6 bn
Resilient-Property-Income Fund	Retail	R18,06 bn
Vukile-Property-Fund	Diversified: without residential	R13.8 bn

Sourced: Wall Street, 2023; Centre for Affordable Housing Finance in Africa, 2017; Real-estate Investment Trust (website), 2023

Research problem

Agency problems may be experienced when it comes to managers and shareholders, when applying solely the agency theory without considering the other CG theories. To mitigate for agency costs and to avoid disloyalty issues and to note that managers will not always be good stewards. Previous work determined the relationship between CG and firm performance, in the US Larker et. al. (2017), Guest (2009), Yermack (1999) Gompers et. al. (2003), Cremers and Nair (2005), in Europe, Bauer, Guenster and Otten (2004); Brounen, De Jong and Koedijk (2004), Drobetz and Momtaz (2020) and in SA (Ntim et. al. (2012); Ntim, (2013); Pamburai et. al. (2015), Rehman and Khan (2016) Maroun and Cerbone (2020). The association between CG and operating performance of REITs has been extensively researched in other parts of the world, but not in SA, even though REITs account for 10% of the top 100 corporations listed on the Johannesburg Stock Exchange. Some of the REIT's literatures proves that there is no significant relation between CG and firm performance, in the US, Bianco et. al. (2007) and Bauer et. al. (2010) and in Asia Lecomte and Ooi (2013). However, others, found a positive link between CG and performance in Asia Cheung et. al. (2007), Cheng (2008). The first issue is that CG theoretical approach study in SA does not exist focusing on REITs.

The CSR is the second independent variable. As Advantage (2020) determined that CSR could generate brand perception and thus improve revenue. Ali et. al. (2020) adopted the agency theory and determined that CSR improves firm's valuation, the agency problems were also highlight in this study. Ntim et. al. (2012) reported on CSR using SA as a laboratory, at that time there were no revision of King Reports III and IV, the study was not industry specific, like a REIT study and CSR was a control variable. The gap in the literature is with regards to the African stock markets.

Research questions

Does the level of CG principles in King III and IV reports influence the performance of SA-REITs?

Objectives

To assess the evolution of CG and uncover the performance of REITs over time.

Hypothesis formulation

There are three key CG theories namely agency, stewardship and resource dependency, application of one is not sufficient to understand the multifaceted CG Shleifer and Vishny (1997); The literature proved the relationship between performance and CG in SA (Pamburai et. al. 2015, Ntim et. al.

2012), even though there are other studies that have proven otherwise. In line with the theories, we therefore come to the below hypothesis.

As one of the disclosures policies CSR is also linked to firm performance by Ali, Sial, Brugni, Hwang, Khuong and Khanh (2020) adopted the agency theory and CSR, this policy has also been linked to firm performance by Ntim, (2013), Ntim et. al. (2012). This study will try to understand, the CG mechanism, the different types of management, the influence of CSR policy on performance of SA-REITs. There are two hypotheses from this study, the main independent variable CGI, second variable CSR.

H1: The performance of SA-REITs is positively influenced by the all-inclusive CG and CGI-indices(s).

H1.2: The performance of SA-REITs is positively influenced by CSR.

Literature Review

CG issues date back to the 1900s ElGabasi (1900) when performance of listed firms was emerging (Georgen, 2006). Berle and Means (1932) explained that the purpose of CG is to reduce agency costs that arise from separation of ownership and control. CG theories essentially decreases agency cost. One review by Simons et. al. (2023) determined that CG is one of the most sort after areas of research globally.

Prior empirical evidence

CG on REIT performance

Positive link between CG and performance

The impact of CG on REITs has been studied globally, we review some of the past work that focused on CG and REITs performance. Chong et. al. (2016) found a positive relation between the CG index with ROA, and on excess returns, which helps to address agency problems. A study by Campbell et. al. (2011) found that corporation with experienced CEOs had higher performance, also Chong et. al. (2018) applied a CG index that proved that not only it helps to improve return on assets (ROA) but also helps to gauge excess returns of REITs. Ramachandran et. al. (2018) also concluded similar results, that all three performance measures were positively correlated, however, also to note highly indebted REITs are risky to investors. Experienced managers of REITs show improved performance and positive correlation to CGs impact. Contradictory to above here the ROA is positively linked to CG.

Negative link between CG and performance

Bianco et. al. (2007) explored the CG index modified by Gompers in 2003, they found a negative impact of CG and protective barriers on performance of REITs in 2004, and that there was little

effect of external governance on performance in 2006. Even with slight improvement in 2006 on performance, their study was inconclusive whether in 2006 REITs were managed more by management companies or these were managed internally. Assets also depreciates and ROA could also affect influence negative results. Bauer et. al. (2010) found that REITs CG Index was not related to value, they used Tobin's Q and performance variables ROA, ROE and funds from operations (FFO), this means that REITs do not appear to be driven by assets they invest in and also REITs with experienced managers experienced improved performance.

SAs literature on CG is mainly on other industries Ntim (2013) Pamburai et al. (2015); Hornmark (2015), Rehman and Khan (2016) and Kemp and Erasmus and Viviers (2017) even though SA-REITs account for 10% of the top 100 companies listed on Johannesburg Stock Exchange (JSE), the African world class exchange (JSE, 2020)

Impact of CSR (ESG) on REIT performance

As one of the agency problems, empire building, Jensen (1986) managers are more concerned about a free cash flow problem than focusing growth of an organisation. Cheng et. al. (2014) found that firms with superior CSR have better access to capital because of reduced agency costs, with greater stakeholder engagement. Harjoto and Jo (2011) found that by providing support, firms use CSR and CG between managers and non-investing stakeholders.

Positive link between CSR and firm performance

Ali et. al. (2020) adopted the agency theory and CSR, this policy has also been linked to firm performance by Ntim, (2013), Ntim et. al. (2012) in SA corporates are expected responsible citizens by giving back. CSR influences SA-REITs performance from above previous studies.

Barneer et. al. (2009) reports that in the US CSR reporting has some form of influence stock performance. Cohen, Holder-Webb and Khalilwe (2017) found that governance influence only seems to be important when CSR is practised or reported by corporations. Whereas Ali et. al. (2016) found that one accounting measure, ROA to have a significant relationship with CG and CSR, this measure was not applied on REITs. Whereas other CG principles like corporate panel and attendance of review commission have no significance with any of the accounting measures.

Literature gap

The gap in the literature is with regards to the African stock markets are as follows. First there is no evidence of previous work on REITs and CG performance. Second the comprehensive CG adopted with localised attributes like employment equity, HIV/AIDS included on the CSR index and the 75 CG provisions extracted from the King-III report and 17 principles from King IV. Third, the previous sampled work includes the top five performing JSE industries an REITs are mostly excluded in these studies, even though with promising growth since inception.

Previous studies had inconclusive evidence whether findings were positively link to performance or otherwise, globally the indices adopted in these studies were different and reporting was also dissimilar.

Conclusion: Review

This research endeavours to overcome short comings in SA prior studies in numerous ways. First 27 REITs are analysed over the period of 2013 to 2022. Dissimilar from prior studies, the influence of both cross-sectional and sequence of discrete time data variations in CG index on company performance, as well as on the 75 CG principles of King-III and 17 principles from King IV. Unlike previous work that focus on certain industries of listed corporation on JSE, the current study expands from existing literature. The study creates a CG and CSR Indices from Kings III and IV. Lastly, to develop the steadfastness of the outcomes, complications that may be posed by the presence of endogeneity, with corporate-level fixed effects, are openly addressed.

Data and Methodology

Data

The study investigates the impact of CG and CSR on the firm's performance for SA-REITs listed on the Johannesburg Stock Exchange (JSE). The datasets are sourced from the company's annual report and Bloomberg for the period between 2013 and 2022.

The sample is drawn from 27 SA-REITs listed on the JSE as of the end of December 2022. To observe the relationship between CG and SA-REITs returns, CG financial data is taken from the *Annual Reports*. The accounting variables are extracted from *Datastream*.

Identification of key variables

CGI

There are various restructuring methods; these include principal component analysis (PCA), and multiple correspondence analysis (MCA) among others. Measurement or nature of the variables always informs the preferred an appropriate method to use. The commonly used method is PCA, and it is appropriate for the restructuring of continuous variables only (Adediran et. al. 2020). Whereas MCA is appropriate for the restructuring of categorical variables (Greenacre and Blasius 2006). We constructed a CG index using MCA. MCA⁴ is a dataset to formulate application, this will allow the exploration of association with a set of variables by transforming the whole data sets into dummy variables to form an indicator matrix cross tabulation among variables, we adopt the

⁴ MCA (Multiple Correspondence Analysis) is a data set analysis used for categorical data, and it detects underlying structures in a data set. This was first introduced by a Mathematician Benzéri in the 1960s and 1970s in France, this analysis is an improvement from PCA (Principal component analysis) and CA (Correspondence analysis). PCA is used for large data sets containing high number of dimensions and the CA is a multivariate statical technique like PCA applies to categorical rather than continuous.

use of singular value decomposition on stata we use `catvar1` and `columns catvar2`. MCA is its use of a singular decomposition and weighted least squares techniques to find low-dimensional best fitting subspaces with minimal inertia and information loss (LeRoux and Rouants, 2010). When the firm is identified with these criteria, it is allotted yes that is one (1), and otherwise zero (0).

In SA, all companies are required to comply with CG provisions after the King IV report in year 2017 all companies must show compliance in their income statements. King IV has 17 principles, and King III has 75 principles that are made up of 9 broad principles and REITs must comply with these from 2013 till 2016.

These results are analysed in the next chapter.

CSR

Since the Ntim et. al. (2012) paper where the CSR variable was tested using word count. Much has changed since then as they proxied King II and thereafter the King III report made it mandatory that all listed corporation should report CSR, and in 2017 the King report IV provided a list of compliance areas that each corporation should report on. Ackers and Stuart (2015) conducted a review on CSR reporting and compliance, and they found that SA is among the first country to make provision of CSR disclosure mandatory for listed corporations and that companies should use their auditor assurance like the big 5, the top five auditing firms to assist in reporting.

Adapted from the King IV these are the recommended practices each corporation should report on, CSR index is formulated using MCA, exploration of association is applied with a set of variables, the data sets are transformed into dummy variables to form an indicator matrix cross tabulation among variables.

CSR variable is taken from the annual reports and the companies' financial statements. We hypothesised a positive relationship with SA-REITs performance.

Performance variables

Our measure of corporate financial performance is commonly used Tobin's Q, nevertheless, to monitor the robustness of our outcomes, and total share returns (TSR), as an alternative and market-based accounting measure, it is total share returns made up of share price and dividends.

Model Specification

The current study draws from the work of Liu and Wu (2016) for a panel analysis with slight modification to obtain a specification as follows:

$$TSR_{it} = \alpha_i + \beta_{i1}CGI_{it} + \beta_{i2}CSR_{it} + \beta_{i3}X_{it} + \varepsilon_i, \quad t=1, 2, 3..T \quad (1)$$

Where TSR_{it} denote the firm's performance, CGI_{it} represents the CG index, CSR_{it} is the Corporate social responsibility, X_{it} represents covariates (such as Total assets, Debt ratio, Audited by the big

4, and cross listing). α_i is constant or intercept, $\beta_{i1}, \beta_{i2}, \beta_{i3}$ are the vectors of explanatory variables, i is individual firm and t is time variable, and ε_i is the error term.

Cross listing- is measured on foreign stock markets tend to have better CG structures (Black *et. al.* 2006; Ntim *et. al.* 2013) a positive relationship with CG is hypothesized, it will take the value of 1 if a REIT is cross listed on foreign stock or 0 otherwise.

Big 5- corporation audited by large corporations are reputable (De Angelo, 1981), we predict the value of 1 if the firm is audited by the five big audit firms in SA or 0 otherwise.

Debt ratio-it means the ratio of debt to equity.

Reliability and Validity

This study has adopted the proven phenomena to measure CG, the creation of index to measure CG has been used in previous studies globally, by Bianco *et. al.* (2007); Bauer *et. al.* (2010). In SA, Ntim *et. al.* (2013) formulated an index that was used to measure the compliance of firms using King II report to create the index. This study creates an index(s) from King III and IV reports, which is unique in nature as it captures all SA attributes.

The indices are created in such a way that they are standardized and used as a measurement instrument to capture REITs CG compliance.

Empirical Results

Estimation procedures

The study employs ordinary least squares (OLS) with standard error robust check and fixed effects estimator in a panel data analysis to control for time-invariant component in the model. The study creates indices for the CSR and joint Kings III and IV. To separate the Kings III from IV, the study uses the count of compliance for each year and for each firm.

The study computed the CSR index using MCA, which is one of the key independent variables. The MCA result shows that CSR and joint Kings III and IV mean is zero (0) and the standard deviation is one (1). The next paragraph shows descriptive statistics results.

Descriptive Statistics

The study focuses on SA REITs for the reason of availability of the data and paucity of study in this area. The study covers the scope of 2013 to 2022, which presented enough information to investigate the impact of the CG index on the performance of the selected firms. Interpolation is applied to generate value of some missing variables, otherwise, the study could have a limitation of a limited dataset as a reason for missing. The study has a strongly balanced panel.

Table 4.1 presents summary statistics of key variables for the selected SA REITs. The study generates performance by subtracting opening price from the closing price, adding it to the dividends and dividing by the opening price, as earlier mentioned when describing the variables. The

dependent variable is the firm performance (total stock returns) with a minimum of -42.162 and a maximum of 42.16.

Table 3 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Dividend	220	15.637	34.676	-27.76	313.43
Opening Price (log)	220	6.796	0.976	3.091	9.37
Closing Price (log)	220	6.794	0.971	3.091	9.341
Opening Price	220	1332.559	1606.754	22	11401
Closing Price	220	1336.073	1613.531	22	11731
Firm Performance(dif.)	220	0.74	5.652	-42.162	42.16
Tobins Q	220	-3.287	33.993	-451.97	2
CSR index	230	0	1.002	-1.087	1.199
Kings III & IV	230	0	1.002	-0.535	4.066
Equity ratio	230	18.445	141.879	-0.27	1459.92
Total Asset	230	0.948	4.554	-34.11	30.49

CSR index denote corporate social responsibility index; Kings III & IV implies joint Kings III & IV index;

The compliance of CG from king III and IV over the time were added together. All the other variables are continuous. CSR ranges from -1.09 and 1.20. Tobins Q is the proxy by market to book ratio with a minimum of -451.97 and a maximum of 2.

Unit root tests

The unit root test at the level and first difference for the stationarity of total stock return and covariates using Levin–Lin–Chu (2002); Breitung (2005); Breitung and Das (2005). At the level of investment and savings, the panel unit root is not statistically significant. While the variables are significant at first difference. The results are consistent with the Breitung unit root test except for Tobins Q and kings III and IV compliance. The findings show that it is not all the variables that are stationary at level, others are stationary at first difference.

Table 4 Unit root tests

	LLC unit-root test		Breitung unit-root	
	(With trend)		(With trend)	
	Level	1 st difference	Level	1 st difference
	Adjusted t*	Adjusted t*	(lambda)	(Lambda)
Firm Performance	-0.810	-6.919***	6.081	-3.072***
Tobins Q	58.459	-1.6e+03***	2.624	2.737
Corporate social responsibility	-1.945**	-7.146***	-2.993***	-0.541
Kings III&IV	7.554	-7.146***	-0.087	-0.541
Total asset	-91.876***	-19.274***	-91.876***	-19.274***
Equity ratio	-2.6e+02***	-18.688***	-2.6e+02***	-18.688***

Note: The test statistics of Levin–Lin–Chu (LLC) test unit-root test are shown as Adjusted t* are reported. The trend was included. *, **, *** implies series stationary significant level at 10%, 5%, 1% respectively. The test statistics of Breitung unit-root test included trend. LLC and Breitung unit-root tests are applicable to balanced panel. Total asset, equity ratio, corporate social responsibility are stationary at level, so, they were used in the analysis at level.

Correlations analysis

The correlation suggests that firm performance and CSR index ($r=0.13$) are positively correlated. This implies that CSR index is likely to increase the firm performance by 13%. Also, joint kings III and IV and firm performance are positively ($r=-0.12$). At least, compliance of kings III and IV is likely to improve the firm performance. The analysis is not likely to suffer multicollinearity in the estimation. See below table

Table 5 Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Total stock return	1.000						
(2) CSR index	0.129	1.000					
(3) kings III & IV	0.012	-0.355	1.000				
(4) Total Asset	-0.115	-0.105	0.076	1.000			
(5) Equity ratio	0.010	-0.139	0.020	-0.024	1.000		
(6) Big 5 Audit firm	-0.092	0.045	0.021	-0.028	0.114	1.000	
(7) Cross-listing	-0.140	-0.034	-0.156	0.117	0.077	-0.056	1.000

CSR index denote corporate social responsibility.

Empirical Results

The result for estimation of CSR and the firm performance. CSR has a significant positive relationship with the firm's performance (Khan et. al. 2023). This implies that CSR is likely to improve firm performance with higher magnitude. Kings III CG compliance has an insignificant relationship with firm performance. Similarly, cross-listing has a significant positive relationship with the firm's performance. While the CSR and equity ratio have a significant positive association with the firm's performance.

Using fixed effects to measure compliance on CSR and Kings (III and IV) and firm relation shows that CSR has a significant positive impact on firm performance.

Table 6 Firm performance and corporate social responsibility

	(1)	(2)	(3)
	OLS	OLS	OLS
Variables	TSR	TSR	TSR
CSR	0.830** (0.412)	8.714 (12.28)	2.870*** (0.837)
CG compliance	0.291 (0.403)		
Total Asset	-0.110 (0.0820)	-0.255 (0.234)	0.0136 (0.0478)
Equity ratio	0.00193 (0.00265)	0.000959 (0.00389)	4.122*** (0.766)
Big 5 Audit firm	-1.298* (0.761)	-0.607 (1.758)	-0.259 (0.508)
Cross-listing	-1.599* (0.866)	-0.521 (1.929)	-2.315*** (0.541)
King III		0.121 (0.216)	
King IV			-0.720*** (0.212)
Constant	2.574***	9.521	8.616***

	(0.818)	(13.23)	(2.837)
Observations	220	90	132
R-squared	0.059	0.026	0.425

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1; TSR denoted total stock return that measures the performance; CSR denote corporate social responsibility index

Using dynamic effects estimator (DFE) CSR has an influence on firm performance. The joint Kings III and IV CG has an insignificant effect on firm performance in the short run. The total assets have a significant positive influence on firm performance. Kings' III compliance has a positive effect on firm performance, but it is not statically significant.

Robustness

For estimation of CSR and Tobin's Q we use ordinary least squares (OLS). CSR has a significant positive relationship with Tobin's Q. Kings III and IV CG compliance has an association with Tobin's Q. Total asset has a significant positive relationship with Tobin's Q. All SA-REITs audited by one of the big five auditing firms has a significant positive relationship with Tobin's Q.

Table 7 Corporate social responsibility and Tobin's Q: OLS

	(1)	(2)	(3)
	With Kings	Kings III	Kings IV
Variables	Tobins Q	Tobins Q	Tobins Q
CSR	4.330*	4.628	0.177*
	(2.520)	(84.26)	(0.103)
CG compliance	2.834		
	(2.462)		
Total Asset	0.241	0.429	0.0159***
	(0.502)	(1.606)	(0.00592)
Equity ratio	-0.000781	0.00236	0.00983
	(0.0162)	(0.0267)	(0.0948)
Big 5	5.209	11.71	0.154**
	(4.658)	(12.07)	(0.0628)
Crosslisting	-2.868	-9.679	-0.0497

	(5.301)	(13.24)	(0.0669)
Kings III		-1.193 (1.484)	
Kings IV			-0.0595** (0.0262)
Constant	-3.747 (5.005)	5.088 (90.79)	0.483 (0.351)
Observations	220	90	132
R-squared	0.026	0.034	0.133

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1; CG compliance addition of kings III and kings IV; CSI denote corporate social responsibility index; Tobins Q measure firm performance

we estimate that CSR and kings (III and IV) CG compliance have insignificant positive impact on Tobins Q. While the equity ratio has a significant positive impact on Tobins Q.

Table 8. Estimation with various selection of variables: King III

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome variable TSR	Fixed effect					
CSR index	0.765* (0.402)	0.0423 (11.86)	-5.786 (16.13)	-5.786 (16.26)	-5.786 (16.26)	-5.786 (16.26)
King III		0.129** (0.0564)	0.129** (0.0568)	0.129** (0.0572)	0.129** (0.0572)	0.129** (0.0572)
Total Asset			0.211 (0.394)	0.211 (0.398)	0.211 (0.398)	0.211 (0.398)
Equity ratio				5.84e-05 (0.00735)	5.84e-05 (0.00735)	5.84e-05 (0.00735)
o. Big 5 Audit					-	-
o. Cross-listing						-
Constant	0.750** (0.374)	-8.022 (13.24)	-14.54 (18.03)	-14.54 (18.17)	-14.54 (18.17)	-14.54 (18.17)
Observations	220	90	90	90	90	90
R-squared	0.018	0.073	0.077	0.077	0.077	0.077
Number of ID	22	22	22	22	22	22

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1

Table 8 presents the effect of different variables the total stock returns. Column (1) shows that corporate social responsibility has a significant positive impact on the firm performance. However, inclusion of Kings III in column (2), reveal that while corporate social responsibility has an insignificant positive impact of the firm performance. Compliance with Kings III improve the firm performance significantly. Column (3) to (6) shows that kings III has a significant positive contribution to the firm performance. The impact are same (they are not different) even with the various inclusion of different variables.

Table 9. Estimation with various selection of variables: King IV

Outcome variable TSR	(1) Fixed effect	(2)	(3)	(4)	(5)
CSR index	0.267 (1.451)	0.266 (1.449)	0.489 (1.436)	0.489 (1.436)	0.489 (1.436)
King IV	-0.0185 (0.264)	0.0379 (1.555)	0.377 (1.546)	0.377 (1.546)	0.377 (1.546)
Total Asset		-0.0565 (0.0507)	-0.0152 (0.0544)	-0.0152 (0.0544)	-0.0152 (0.0544)
Equity ratio			1.964* (1.014)	1.964* (1.014)	1.964* (1.014)
o. Big 5 Audit				-	-
o. Cross-listing					-
Constant	2.691 (22.46)	0.630 (22.51)	-5.848 (22.48)	-5.848 (22.48)	-5.848 (22.48)
Observations	132	132	132	132	132
R-squared	0.000	0.012	0.046	0.046	0.046
Number of coycode	22	22	22	22	22

Standard errors in parentheses:*** p<0.01, ** p<0.05, * p<0.1

Table 9 presents the effect of Kings IV with different variables on the total stock returns. Column (1) shows that corporate social responsibility has an insignificant positive impact on the firm performance. While kings IV has an insignificant negative impact on the measure of firm performance. With the inclusion of Kings IV and total asset in column (2), the findings show that corporate social responsibility and Kings IV have an insignificant positive impact of the firm performance. The compliance with Kings IV present an inconclusive increase in the firm performance (see column (3) to (5)). However, the impact of Kings IV are not different even with the various inclusion of different variables.

Conclusion

Chen et. al. (2007) dividend paying firms have higher earnings than no dividend paying firms, this mitigates the agency costs, from our results we proved that REITs that have remuneration policies

and systems in on dividend payment were likely to mitigate this agency cost. Like Campbell et. al. (2011) we find that managers with experienced boards have a higher performance, CG leadership will likely improve performance note that this is not statistically significant. In addition, Chong et. al. (2018) explained that this helps to reduce excess return. The CGI index results with striking results on board, remuneration and audit committees, to manage excess cash flows corporations that have audit and remuneration committees in place will likely reduce this agency problem significantly. Also, similar to Benabou and Triole (2010) and Eccles et. al. (2012) these committees will assist deterring managers in their interest with projects that lower the initial investment outlay.

The stewardship theory fails to account where managers do not become good stewards Bathula and Singh (2015), and Ali et. al. (2020) mentioned that monitoring management performance by making use of committees alone does not guarantee management performance. When the firms are audited by the big 5 the significance levels of performance improve. It can be concluded that CG has a positive correlation to SA-REITs, but this is not significant, as each principle behaves differently, but SA-REITs that are also cross listed will likely influence performance.

Our findings on CSR and SA-REITs performance close the gap in the literature that currently exist, not much work was conducted after Westermann (2018) conducted a review and found that there is limited literature on CSR and firm performance. Our index shows a positive relationship with the firm's performance (Khan et. al. 2023). This implies that CSR is likely to improve firm performance by 13%. CSR and equity ratio have a significant positive association with the firm performance. Cheng et. al. (2014) firms with superior CSR have better access to capital because of reduced agency costs, with greater stakeholder engagement.

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**Peer Reviewed*

Adoption of Community Land Trusts into Housing Policy for Provision of Affordable Housing Developments in Nigeria

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Abstract

Nigeria, like many other developing countries, faces significant challenges in providing affordable housing for its citizens, particularly in major cities experiencing population growth and urbanization. This study focuses on assessing the feasibility of implementing the Community Land Trust (CLT) model to address this pressing issue. Through a comprehensive review of literature and responses from thirty-one stakeholder interviewed, the study examines the success of CLTs in other countries, identifies opportunities and challenges associated with implementing CLTs in Nigeria, and explores potential partnerships among the government, private sector, and community organizations. Furthermore, the study evaluates the potential impact of integrating CLTs into Nigeria's housing policy, aiming to enhance the provision of affordable housing and improve the quality of life for low-income families. The study concludes that adopting the CLT model into Nigeria's housing policy holds promise as a sustainable solution for affordable housing provision and has significant implications for policy and practice in the affordable housing sector, not only in Nigeria but also in other developing countries confronting similar challenges.

Key words: Community Land Trusts, Housing Policy, Affordable Housing, Low-Income Families, Sustainable Housing

Introduction

Homelessness and poverty are pervasive issues affecting millions of people globally (Enwin & Ikiriko, 2023). The critical shortage of affordable housing in Nigeria poses significant socio-economic challenges due to rapid population growth and urbanization. To address this crisis, there is need for the adoption of Community Land Trusts (CLTs) which has gained attention as a promising solution in the developed world (Udom, 2017). CLTs separate land ownership from housing ownership, empowering communities to govern the land trust and ensure long-term affordability (Boling and DeCarlo, 2018; Davis, 2009; Wadsworth, 2021). However, the applicability of CLTs in Nigeria remains unexplored, given the failure of conventional housing policies to address affordability and community empowerment (Ademiluyi and Jimoh, 2019; Olusola and Durodola, 2021). Understanding the viability and challenges of integrating CLTs into Nigeria's housing policy landscape becomes an issue of concern, considering its unique cultural, legal, and institutional contexts (Ademiluyi and Jimoh, 2019; Olusola and Durodola, 2021). Through an interdisciplinary approach, the research seeks to provide evidence-based insights for

policymakers and practitioners, prioritizing the rights and well-being of marginalized populations (Ijigade, 2014; Olusola and Durodola, 2021).

Aim and Objectives

The aim of this paper is to explore the adoption of Community Land Trusts (CLTs) into housing policy for the provision of affordable housing developments in Nigeria. The specific objectives of the study are as follows:

To review the CLT model and its success in providing permanently affordable housing in other countries.

To identify the opportunities and challenges of implementing CLTs in Nigeria.

To propose policy and regulatory frameworks to support the establishment of CLTs in Nigeria.

To explore potential partnerships between the government, private sector, and community organizations to develop and manage affordable housing projects through the CLT model.

To evaluate the potential impact of adopting CLTs into housing policy in Nigeria on the provision of affordable housing and the quality of life of low-income families.

Literature Review

Theoretical framework for the Study

The theoretical framework for this study on the adoption of Community Land Trusts (CLTs) into housing policy in Nigeria is based on three interconnected theories: Social Capital Theory, Institutional Theory, and Housing Policy Implementation Theory.

Social Capital Theory, introduced by Putnam (2000), highlights the significance of networks, relationships, and trust in achieving collective goals. In this study, it suggests that the success of CLTs in providing affordable housing in Nigeria depends on the trust and collaboration among community organizations, government agencies, and the private sector.

Institutional Theory, as discussed by Scott (2014), focuses on the role of formal and informal institutions in shaping social behavior and promoting social change. It proposes that the adoption of CLTs into housing policy requires establishing formal institutions, like the Community Land Trust Fund and Land Trust Authority, and developing informal institutions, such as community partnerships and networks, to support their success in Nigeria.

Housing Policy Implementation Theory emphasizes the importance of policy design, implementation, and evaluation. It suggests that a well-designed policy framework, effective implementation strategies, and rigorous policy evaluation mechanisms are crucial for ensuring the success and sustainability of CLTs in Nigeria (Sabatier, 1986).

Definition and Principles of Community Land Trusts

The concept of Community Land Trusts (CLTs) has gained attention as an innovative approach to providing permanently affordable housing. CLTs are community-based organizations that separate land ownership from housing unit ownership, ensuring long-term affordability and community stewardship. Davis (2009) defines CLTs as nonprofit organizations for community land and resource stewardship, emphasizing community control, long-term affordability, and democratic decision-making. Nhlapo (2012) highlights CLTs' role in creating sustainable and inclusive communities, bringing stakeholders together for affordable housing and community development. Thaden and Angotti (2014) describe CLTs as collective ownership, combining affordable housing, resident empowerment, and democratic governance, emphasizing community involvement and long-term affordability. These authors contribute to understanding the definition and principles of CLTs, emphasizing community control, affordability, resident empowerment, and the importance of democratic decision-making and community involvement in CLT models.

Concept and Principles of Community Land Trusts

Community Land Trusts (CLTs) have emerged as an innovative model for addressing affordable housing and community development challenges. CLTs operate on the principles of separating land and housing ownership, community governance, and long-term affordability. According to Davis (2009), CLTs acquire and hold land in trust while individuals or families own the structures, ensuring long-term affordability and preventing speculation.

Governance in CLTs involves community members, residents, and stakeholders participating in decision-making processes, as highlighted by Nhlapo (2012). This democratic approach reflects community needs and aspirations. Long-term affordability is central to CLTs, achieved through mechanisms such as ground leases or resale restrictions, ensuring permanent affordability for low-income households. Thaden and Angotti (2014) stress the importance of long-term affordability in preserving community diversity. Davis (2009), Nhlapo (2012), and Thaden and Angotti (2014) collectively enrich our comprehension of the conceptual underpinnings and guiding principles of CLTs, which encompass crucial aspects such as land separation, community governance, and long-term affordability.

Affordable Housing

Affordable housing has been a subject of discourse in the United States, and it has faced historical challenges, with neglect by the federal government and a focus on middle and high-income earners rather than low-income households (Martens, 2009; Sazama, 2000). Sazama (2000) emphasizes the significance of affordable housing cooperatives, rooted in the cooperative movement, as an alternative that empowers low to moderate-income families through democratic decision-making and joint property ownership. Land Trusts, which function as non-profit consumer cooperatives, have also shown success in providing affordable housing (Sazama, 2000). The U.S. Department of Housing and Urban Development defines affordable housing as units that do not exceed 30% of a household's income (Downs, 2004). The rising cost of living and stagnant wages have led to increased housing needs among low-income households in major metropolitan cities (Miller,

2015). Short-term affordability tenures provided by developers have proven to be unsustainable, resulting in the loss of affordability once the tenure expires (Miller, 2015).

Methodology

The study employs a comprehensive approach, integrating various data collection methods to thoroughly explore the subject matter. Beginning with a secondary methodology, a comprehensive literature review and meticulous case study analysis were conducted. This approach aims to synthesize existing knowledge and gain a nuanced understanding of Community Land Trust (CLT) implementation not only in the Nigerian context but also globally. This dual-pronged process consists of two distinct components: a thorough examination of a representative selection of international and national articles elucidating the discourse on CLTs, and a deliberate selection of 18 papers subjected to meticulous scrutiny guided by a purposive approach.

In addition, Semi-Structured Interviews were conducted, serving as a means to comprehensively explore the diverse experiences and perspectives relevant to implementing CLTs within Nigeria. This qualitative method serves as a way to uncover nuanced insights and foster a deep contextual understanding.

The study carefully assembles a group of 31 participants, strategically divided into distinct categories to ensure a comprehensive representation of stakeholders. This stratification includes six senior officers from governmental agencies, recognized for their pivotal roles in the housing sector. Additionally, three representatives from community organizations contribute grassroots viewpoints, while twelve professionals deeply entrenched in housing development provide perspectives rooted in the industry. To further enrich the group, ten key informant experts specializing in affordable housing are divided into five Estate Valuers and five Town Planners. Data collection takes place through face-to-face interviews, a method that fosters intimate exchanges conducive to extracting nuanced insights that may not be attainable through conventional survey instruments.

Findings

Review of the CLT Model and Its Success in Providing Permanently Affordable Housing in Other Countries (US, UK, and Canada)

The CLT model has been successfully implemented in several countries to provide permanently affordable housing to low-income families. The model has been widely studied and evaluated, with a growing body of research supporting its effectiveness. Some of the authors who have researched and written about the CLT model's success in providing affordable housing include Thaden and Lowe (2018) who studied the CLT model in the United States and found that CLTs have been effective in creating and preserving affordable housing, promoting community development, and increasing community ownership of land.

Durán and Zúñiga (2019) evaluated the CLT model's effectiveness in Chile and found that it can successfully provide affordable housing in both urban and rural areas. They also found that CLTs can contribute to the economic and social development of the communities they serve.

Angotti and Morse (2018) analyzed the implementation of CLTs in New York City and found that the model is effective in promoting community control over land and housing, preserving affordable housing, and combating gentrification.

Venegas and Chapple (2019) studied the implementation of CLTs in California and found that the model can provide affordable housing to low-income families while also promoting sustainable and equitable community development.

Review of Case Studies from different Countries where CLTs have been Successfully Implemented

Community Land Trusts (CLTs) have gained recognition and success in various countries as an effective model for providing affordable housing and fostering community development. This section reviews case studies from different countries where CLTs have been implemented, including the United States, United Kingdom, and Canada, drawing on the works of prominent authors in the field.

In the USA, the Burlington CLT in Vermont, Champlain Housing Trust in Vermont, the Dudley Street Neighborhood Initiative in Boston, and the Cooper Square Community Land Trust in New York City have been widely recognized as the most successful CLTs. Burlington CLT in Vermont has been praised for its long-standing success in preserving and creating affordable housing options for low-income residents in Burlington. It has developed a diverse portfolio of affordable housing properties and played a crucial role in addressing housing affordability challenges in the community.

The Champlain Housing Trust, also based in Vermont, is one of the largest community land trusts in the USA. It has been instrumental in creating affordable housing opportunities and supporting community development initiatives in the Champlain Valley region.

The Dudley Street Neighborhood Initiative in Boston has gained recognition for its community-led efforts in transforming a distressed neighborhood into a thriving and sustainable community. The initiative involves a CLT model that empowers residents to have control over land and housing development decisions.

The Cooper Square Community Land Trust in New York City is known for its successful efforts in preserving affordable housing and preventing displacement in the Lower East Side neighborhood. It has provided secure and affordable housing options to low-income residents through its community land trust model.

Moving to the United Kingdom, the concept of Community Land Trusts (CLTs) has a historical foundation dating back to the garden cities project of Letchworth and Welwyn, which aimed to transform urban areas into well-planned environments (Davis, 2014; Dunn, 2009). In Scotland, the emergence of CLTs was driven by a lack of housing investment and resistance from feudal

landowners to sell land for individual development, leading to the Scottish land reforms Act in 2003, granting communities the right to purchase land (Mckee, 2012). This model has demonstrated positive outcomes in Scotland, including increased community asset acquisition, support for community land ownership, empowerment in land management, job opportunities, and affordable housing (Allison, 2014; Murray, 2013).

CLTs have also gained government support as a means of preserving affordable housing, particularly during a time of housing shortages and reduced local authority funding (DCLG, 2011). They are seen as a timely tool to integrate into local government housing policies, addressing the challenges posed by high living costs and stagnant wages (Miller, 2015). CLTs are considered a preferable alternative to short-term affordability tenures provided by developers on behalf of councils, which often result in loss of affordability after the tenure expires. Cities adopt CLT models, tailored to their specific circumstances, to tackle housing affordability and respond to local opportunities and challenges (Miller, 2015).

From a planning perspective, CLTs represent a proactive approach to land management, enabling communities to have greater control over their housing and ensuring long-term affordability.

The London Community Land Trust (London CLT) has been a prominent example of successful CLT implementation. In their article "Lessons from the London Community Land Trust" (2016), Tim Mather and Paul Chatterton highlight the achievements of the London CLT in developing affordable housing projects in the city and empowering local communities through collective decision-making.

The Cornwall Community Land Trust, St. Minver Community Land Trust (CLT), St Teath, Brambleside are all in the UK.

The growth of community land trusts (CLTs) in Cornwall has been facilitated by the Cornwall Community Land Trust (CCLT), an umbrella body that provides assistance and support for development (Northcott, 2010). Established in April 2006 as a non-profit company and registered as an Independent and Provident society with Charity rules in 2007, the CCLT has played a crucial role in delivering over 150 affordable homes for local people in Cornwall (Cornwall Community Land Trust). It has also supported the establishment of seven community land trusts by working with local communities in the delivery of affordable homes. Additionally, the CCLT has helped finance Cornwall CLT's operating costs through alternative revenue sources, providing development services, expertise, and peppercorn ground rents, ensuring a sustainable source of income (Northcott, 2010).

The CCLT has benefited from its affiliation with a host organization, resulting in reduced costs associated with administration and infrastructure (Northcott, 2010). It has also built strong connections with stakeholders in the region, particularly in securing support from Councils, while the local community land trusts registered with CCLT have established strong links with their respective Parish Councils. Collaborating with Cornwall Council, the CCLT developed a revolving loan fund to provide income access and facilitate land purchase for affordable housing development, instilling confidence in District Councils to direct local community groups towards CCLT for assistance in meeting their area's housing needs (Northcott, 2010).

St. Minver is a civil parish and village located in northern Cornwall, England, with a population of 532,273 as of the 2011 census (Office of National Statistics). The establishment of the St. Minver Community Land Trust (CLT) was a response to the housing affordability challenges faced by local residents in St. Minver, Cornwall (National Community Land Trust Network). Registered as a charity company in 2008, the CLT received a start-up grant of £5,000 from the North Cornwall District Council and an interest-free loan of £544,000. In 2010, the CLT received further assistance from the Cornwall Rural Housing Association, and in 2011, it entered its second phase of housing development, which included self-build plots and socially rented housing. The Cornwall Rural Housing Association provided 8 self-build plots and 4 rented houses for this phase (The Self Build Guide, 2009).

The primary objective of the St. Minver CLT was to provide affordable housing to residents who were unable to afford homes in the area due to high house prices driven by the demand for holiday properties. The resulting out-migration of young people who could not find affordable housing had a significant impact on the local economy (The Self Build Guide, 2009). Statistics on dwellings in Cornwall indicated a high percentage of unshared dwellings (99.9%) and relatively low proportions of terraced houses and flats (22.8% and 8.6% respectively) (Office of National Statistics, 2013). In St. Minver specifically, there were a total of 2,067 dwellings in 2011, with 52.2% of them classified as holiday homes (Cornwall Council, 2016). The local plan emphasized the sustainability of the area as an Area of Outstanding Natural Beauty (AONB) and highlighted the need for increased three and four-bedroom housing to accommodate the growing number of young families working and potentially residing in the area permanently (Cornwall Council, 2016).

The issue of housing affordability is a significant concern in St Teath, as it is in other nearby villages in Cornwall. In response to this challenge, the community took proactive steps to address the issue by developing 16 affordable houses, which were completed in 2011. All 16 houses have been sold (10) or rented (6) since then, showcasing the success of this initiative (St Teath). Building on this success, a new development of 12 affordable housing units was planned for August 2015, demonstrating the ongoing commitment of Cornwall Community Land Trusts to providing affordable housing solutions (Cornwall Community Land Trusts).

According to Michael Brown and Greg Rosenberg in their book "The Community Land Trust Handbook" (2012) and Udom and Weje (2019), these CLTs have created substantial number of permanently affordable housing units and have demonstrated the long-term viability of the CLT model.

In Canada, the Parkdale Neighbourhood Land Trust (PNLT) in Toronto stands as a notable case study. The PNLT was established in response to the challenges faced by the Parkdale neighborhood, characterized by gentrification, rising housing costs, and the displacement of low-income residents. It was founded in 2011 as a non-profit organization with the aim of acquiring and preserving land for the benefit of the community.

One of the key accomplishments of the PNLT has been its successful acquisition of properties in Parkdale. Through strategic partnerships, community fundraising, and government support, the PNLT has obtained several properties, including residential buildings, commercial spaces, and

green spaces. These acquisitions have allowed the PNLT to protect affordable housing and community assets from being sold or redeveloped for higher-priced market uses.

The PNLT has played a crucial role in maintaining the affordability of housing in Parkdale. By owning and managing properties, the PNLT can ensure that housing units remain affordable for low-income residents. This has helped to prevent the displacement of vulnerable community members and maintain the social and economic diversity of the neighborhood.

Furthermore, the PNLT has actively engaged the community in decision-making processes. It has established a democratic governance structure, with a board of directors composed of local residents, stakeholders, and experts. This inclusive approach allows community members to participate in shaping the direction and priorities of the PNLT, ensuring that it serves the needs and aspirations of the Parkdale community.

The impact of the PNLT extends beyond affordable housing. The organization has been instrumental in promoting community well-being, fostering social cohesion, and enhancing neighborhood resilience. Through its efforts, the PNLT has created community gardens, public spaces, and cultural hubs, providing opportunities for local residents to connect, collaborate, and thrive.

In their research paper "Community Land Trusts and Affordable Housing: Insights from the Parkdale Neighbourhood Land Trust in Toronto" (2020), Emily Paradis and Josh Dale provide insights into the PNLT's efforts to preserve affordable rental housing, prevent displacement, and engage the community in decision-making processes.

The case studies from the United States, United Kingdom, and Canada showcase the success of CLTs in providing affordable housing and empowering communities.

These case studies demonstrate the diverse ways in which CLTs have been implemented and their effectiveness in providing affordable housing solutions. They highlight the importance of community engagement, long-term affordability, and sustainable governance structures. These international examples offer valuable lessons and inspiration for the implementation of CLTs in different contexts, including Nigeria.

Examination of Key Characteristics, Achievements, and Challenges of CLTs

Community Land Trusts (CLTs) have emerged as innovative models for providing permanently affordable housing, with various CLTs around the world showcasing remarkable characteristics, achievements, and also facing unique challenges. This section examines the key aspects of CLTs, their notable achievements, and the challenges they encounter in ensuring the long-term affordability of housing.

Key Characteristics

Separation of Land Ownership and Housing Ownership: CLTs operate on the principle of separating the ownership of land from the ownership of housing units. This enables the CLT to retain ownership of the land, while individual homeowners or tenants have the right to occupy and utilize the housing units.

Community Governance and Decision-Making: CLTs involve community members in the governance and decision-making processes, allowing them to actively participate in shaping policies, setting guidelines, and maintaining the affordability of the housing units.

Achievements

Permanently Affordable Housing: One of the primary achievements of CLTs is the provision of permanently affordable housing. CLTs utilize mechanisms such as long-term lease agreements and resale restrictions to ensure that housing units remain affordable for successive generations.

Community Stabilization and Empowerment: CLTs have demonstrated the ability to stabilize communities by preventing displacement and creating opportunities for community members to actively participate in the management and decision-making processes. This empowerment fosters a sense of ownership and pride within the community.

Challenges

Access to Land: Acquiring land at an affordable price poses a significant challenge for CLTs. The rising costs of land can impede the establishment and expansion of CLTs, limiting their ability to provide affordable housing options.

Funding and Financial Sustainability: CLTs often face financial challenges in securing funding for land acquisition, infrastructure development, and ongoing maintenance. Ensuring the long-term financial sustainability of CLTs is crucial to maintain the affordability of housing units.

Legal and Regulatory Barriers: CLTs may encounter legal and regulatory barriers in some jurisdictions, which can impede their ability to operate effectively. Overcoming these barriers requires collaboration with policymakers and advocating for supportive legal frameworks.

These key characteristics, achievements, and challenges highlight the importance and complexities of CLTs in providing permanently affordable housing. Understanding and addressing these factors are essential for the successful implementation and sustainability of CLTs in Nigeria and other countries.

Impact of CLTs on Affordable Housing

Community Land Trusts (CLTs) have emerged as a promising solution to the affordable housing crisis, addressing affordability, tenure security, and community development. CLTs ensure long-term affordability by separating land ownership from housing ownership, employing resale restrictions and lease agreements to maintain affordable prices (Kingsley, 2017; Davis & Diamond, 2011; Sazama & Lewis, 2016). Tenure security is enhanced through long-term lease agreements and shared equity models, fostering stability and investment in homes and communities (Hartman & Robinson, 2003; Gurstein, 2007; Jackson, 2017). CLTs also promote community development by involving residents in decision-making, leading to a sense of ownership and empowerment (Hudson, 2009; Gurstein, 2007; Kawashima-Ginsberg, 2009). These impacts contribute to the success of CLTs in providing affordable housing and fostering community cohesion.

Best Practices and Lessons Learned from CLT Implementations

Financing Strategies: Effective financing strategies play a crucial role in the success of Community Land Trusts (CLTs). Hickey and Mohan (2012) suggest combining public and private funding sources, such as government grants, philanthropic support, and partnerships with financial institutions, to ensure financial sustainability and enable the provision of affordable housing.

Land Acquisition: Acquiring land at affordable prices is a major challenge for CLTs. Murphy (2010) and Breslau (2014) emphasize the importance of creative strategies, including partnerships with municipalities, non-profit organizations, and land trusts, to secure land for CLTs. Community engagement and advocacy efforts are also effective in gaining access to land for CLT initiatives.

Community Engagement: Active community engagement is essential for CLT success. Meek (2017) highlights the significance of community involvement throughout the CLT process, from design to ongoing management of affordable housing projects. Strong community support and participation enhance the long-term sustainability of CLTs.

Governance and Management: Effective governance structures and management practices are vital for CLTs. Clapham (2010) emphasizes democratic decision-making, clear roles and responsibilities, and transparent management practices. Building organizational capacity and establishing partnerships with local stakeholders contribute to successful governance and management of CLTs.

Factors Contributing to Success or Failure of CLTs

Various factors contribute to the success or failure of Community Land Trusts (CLTs) in achieving their affordable housing goals. Research by DeFilippis and Saegert (1996), Murphy and Shearer (2004), and others highlights important considerations for CLT success. These include securing long-term affordability mechanisms, establishing strong legal frameworks, addressing community-specific challenges, garnering community support, effective leadership, and ongoing monitoring and evaluation. Ensuring long-term affordability is crucial, and DeFilippis and Saegert (1996) emphasize the importance of robust affordability mechanisms, such as resale restrictions and leasehold arrangements, to maintain affordability for future generations. Additionally, a supportive legal framework and favorable policies play a significant role in CLT success, as highlighted by Wiewel and Lewis (2010), who emphasize the importance of comprehensive land-use policies, favorable tax regulations, and legal protections for CLTs.

Strong community support and engagement are key factors in CLT success. Studies by Murphy and Shearer (2004) and Kildegaard and Rosenthal (2008) emphasize building community relationships, fostering trust, and involving community members in decision-making processes. Effective leadership and governance structures are also crucial, as highlighted by Clay (2018), emphasizing competent and committed leadership and transparent, accountable governance structures. Financial viability and resource mobilization are critical for CLT success, as noted by Davis and Kuby (2015). Diverse funding sources, including public grants, philanthropic support, and partnerships with financial institutions, enable CLTs to acquire land, develop affordable housing, and maintain long-term affordability.

Monitoring and evaluation, as emphasized by Davis and McQuarrie (2014), help assess performance and impact, while evaluation of policy implementation, according to Gray and Mueller (2019), identifies areas for improvement and informs policy adjustments. Engaging stakeholders, including residents, community members, government officials, and funders, in feedback and evaluation processes, is crucial for inclusive decision-making, as highlighted by Warren and Tice (2014). Finally, adaptation and learning, as emphasized by Blandy and Latham (2018), enable CLTs to evolve, address challenges, and make informed decisions for continuous improvement.

The lack of a legal framework and limited political will pose challenges to the implementation of Community Land Trusts (CLTs) in Nigeria (Kaczynski & Bowling, 2018; Federici & Kohashi, 2021). Establishing a legal framework and gaining government support are crucial for the successful adoption of CLTs into housing policy. The funding challenge is another significant barrier, which could be addressed through the establishment of a Community Land Trust Fund (CLTF) financed by government allocations, private donations, and grants (Oyebisi, Toye and Adeniji, 2019). Capacity building and training for community organizations are essential for their effective participation in CLTs, encompassing land acquisition, infrastructure development, financial management, and governance (Ajayi, Samuel & Olowolaju, 2018). Additionally, Okolie and Onuoha (2020) suggest incentivizing private developers through tax benefits and providing direct subsidies to CLTs for land acquisition and infrastructure development.

Proposed Policy and Regulatory Frameworks to Support the Establishment of CLTs in Nigeria

Proposing policy and regulatory frameworks to support the establishment of Community Land Trusts (CLTs) in Nigeria requires a comprehensive understanding of the legal and policy environment. Several authors have provided suggestions for such frameworks. Kaczynski and Bowling (2018) propose legal amendments and financial incentives to promote CLTs, while Oyebisi, Toye, and Adeniji (2019) suggest adopting a public land trust model and providing tax incentives for land donations. Ajayi, Samuel, and Olowolaju (2018) propose a national regulatory agency to oversee CLTs and provide technical assistance. Oyebisi, Toye, and Adeniji (2019) recommend the establishment of a Community Land Trust Fund (CLTF) financed through various sources. Additionally, Okolie and Onuoha (2020) propose tax incentives and direct subsidies for CLTs, and Akamani and Kwofie (2021) suggest creating a land bank to support CLTs. These policy and regulatory frameworks aim to provide legal recognition, financial support, technical assistance, and oversight for CLTs in Nigeria.

Exploration of Potential Partnerships Arrangement

Partnerships between the government, private sector, and community organizations have been proposed by various authors as a means to develop and manage affordable housing projects using the Community Land Trust (CLT) model. Oyebisi et al., (2019) suggest government support through technical assistance and access to funding, proposing the creation of a Community Land Trust Fund (CLTF) to finance land acquisition and affordable housing construction through government allocations, private donations, and grants. Okolie and Onuoha (2020) propose partnerships between private developers and CLTs, with tax incentives for developers and direct

subsidies for CLTs to reduce land acquisition and infrastructure costs. Federici and Kohashi (2021) advocate for partnerships and propose a Land Trust Authority (LTA) overseen by the government to facilitate the establishment and management of CLTs, funded by private investors. Ajayi et al. (2018) highlight the importance of government-community organization partnerships and suggest land banks supported by government policy and funding to aid CLTs in land acquisition.

Evaluation of the Potential Impact of Adopting CLTS into Housing Policy in Nigeria

The adoption of Community Land Trusts (CLTs) in Nigeria has the potential to address the affordable housing crisis and improve the quality of life for low-income families. Oyebisi et al., (2019) highlight the benefits of CLTs in providing affordable housing, reducing homelessness, and promoting community development. They propose the establishment of a Community Land Trust Fund (CLTF) to support land acquisition and construction, along with technical assistance and governance support for community organizations. Federici and Kohashi (2021) suggest the creation of a Land Trust Authority (LTA) funded by private investors and supported by the government to oversee CLTs, preserving land and promoting financial sustainability. Kaczynski and Bowling (2018) emphasize the need for a legal framework to protect land and housing rights and enable fair negotiations. Ajayi et al. (2018) stress the importance of government-community partnerships, while Okolie and Onuoha (2020) propose collaborations with private developers and government incentives. Ladipo and Fadairo (2020) highlight the potential of CLTs to address housing deficits, promote sustainable urban development, and social inclusion. Challenges include resistance from landowners, lack of political will and the need for capacity building for community organizations (Oyebisi et al., 2019; Ajayi et al., 2018).

Output from Key Informants Interview in Lagos and Port Harcourt

The study employed interviews with government officials, housing developers, community organizations, and experts in affordable housing to explore the opportunities and challenges associated with implementing Community Land Trusts (CLTs) in Nigeria. These interviews allowed for firsthand knowledge and insights from stakeholders involved in the housing sector. The study aimed to identify opportunities and challenges specific to Nigeria's political, social, economic, and cultural contexts. A cumulative outcome of the transcript of the interview from the various cohorts is presented thematically as follows:

Government Officials

Opportunities of CLTs in Nigeria

Question: What opportunities do you see in implementing CLTs in Nigeria?

Responses: Implementing CLTs in Nigeria holds tremendous potential. Firstly, it offers a unique solution for catering to the housing needs of low-income families who are often left out of traditional housing options. This contributes to a more inclusive society. Secondly, CLTs foster community growth and empowerment by engaging residents in decision-making, creating a sense

of ownership, and enhancing social bonds. Lastly, the collaborative nature of CLTs encourages partnerships between government bodies, private enterprises, and local organizations, leveraging a variety of resources and expertise for sustainable housing development.

Challenges of Implementing CLTs in Nigeria

Question: What challenges do you anticipate in implementing CLTs in Nigeria?

Responses: Introducing CLTs in Nigeria comes with its set of challenges. Firstly, raising awareness and understanding about the CLT model among government officials, stakeholders, and the public is a significant hurdle that requires dedicated efforts. Secondly, securing suitable land for CLT projects in densely populated urban areas can be intricate and resource-intensive. Additionally, establishing effective governance structures and ensuring long-term financial viability for CLTs entails careful planning and coordinated strategies.

Housing Developers

Opportunities of CLTs in Nigeria

Question: What opportunities do you see in implementing CLTs in Nigeria?

Responses: Implementing CLTs in Nigeria will open new horizons for housing developers. Firstly, it will provide an avenue for socially responsible and sustainable housing development, making a positive impact on communities. Secondly, CLTs will offer a potential market for creating affordable housing units, tapping into government incentives or subsidies for such projects.

Challenges of Implementing CLTs in Nigeria

Question: What challenges do you anticipate in implementing CLTs in Nigeria?

Responses: Challenges abound in introducing CLTs in Nigeria. Land acquisition for CLT projects can be complex and costly, especially in urban areas. Moreover, ensuring long-term affordability requires serious financial support and management, which can be demanding. Additionally, creating awareness and changing perceptions about CLTs among stakeholders and the public may be a challenge.

Community Organization

Opportunities of CLTs in Nigeria

Question: What opportunities do you see in implementing CLTs in Nigeria?

Responses: For community organizations, CLTs offer exciting prospects. They serve as a means to address the dire need for affordable housing and cater to marginalized communities. CLTs empower residents, promote social inclusion, and enhance community cohesion. Furthermore, CLTs can facilitate community capacity building and economic empowerment by creating job opportunities and skill development initiatives.

Challenges of Implementing CLTs in Nigeria

Question: What challenges do you anticipate in implementing CLTs in Nigeria?

Responses: Introducing CLTs in Nigeria will pose several challenges for community organizations. Some of such challenges will include limited access to suitable land for CLT projects, potential conflicts with traditional land tenure systems, and securing sustainable financing. Changing perceptions about CLTs among stakeholders and the public might also prove to be an obstacle. It is obvious that most of us (Community organizations) will require support in terms of technical expertise, funding, and coordination to effectively overcome these challenges.

Experts in Affordable Housing (Estate Valuers and Urban Planners)

Opportunities of CLTs in Nigeria

Question: What opportunities do you see in implementing CLTs in Nigeria?

Responses: Presently, there is no known CLT model operation in Nigeria. Implementing CLTs in Nigeria presents a wealth of opportunities. It offers a viable solution to address the housing needs of underserved low-income individuals and families. CLTs foster community engagement, empower residents, and ensure the long-term affordability of housing. Additionally, CLTs can stimulate economic growth and create jobs in the affordable housing sector, which could have a positive ripple effect on the economy.

Challenges of Implementing CLTs in Nigeria

Question: What challenges do you anticipate in implementing CLTs in Nigeria?

Responses: There are several challenges that might arise in implementing CLTs in Nigeria. These include complex land acquisition processes, resistance from traditional landowners, and ensuring the financial sustainability of CLTs. Furthermore, raising awareness and understanding about the CLT model among stakeholders could be demanding. Effective collaboration between government agencies and other stakeholders is key to navigating the existing policy and regulatory landscape to create an environment conducive to CLTs.

Summary of Opportunities and Challenges as extracted from Key Informants

Opportunities of Implementing Community Land Trusts (CLTs) in Nigeria

Alternative Affordable Housing Model: CLTs will offer an alternative approach to address the housing needs of low-income families who cannot afford conventional homeownership.

Community Development and Empowerment: CLTs will promote community development by involving residents in decision-making processes, fostering empowerment.

Partnership Leverage: CLTs will facilitate collaborations between the government, private sector, and community organizations, leveraging resources and expertise for housing development.

Social Responsibility for Housing Developers: Developers engaging in CLTs can contribute to socially responsible and sustainable housing development, making a positive community impact.

Market Opportunities: CLTs will provide a potential market for developers to create affordable housing units and access government incentives or subsidies.

Social Inclusion and Cohesion: CLTs will contribute to social inclusion, community cohesion, and long-term affordable housing options for marginalized populations.

Economic Empowerment: CLTs will serve as platforms for community capacity building and economic empowerment through job creation and skill development initiatives.

Attracting Investment and Economic Growth: CLTs will attract investment, stimulate economic growth, and create jobs within the affordable housing sector.

Challenges of Implementing Community Land Trusts (CLTs) in Nigeria

Awareness and Understanding: There's a need for increased awareness and understanding of the CLT model among government officials, stakeholders, and the general public. This presently is lacking.

Land Acquisition: Securing suitable land for CLT projects, especially in urban areas, will be complex, competitive, and costly. This will hamper the fulfillment of the CLT model.

Long-Term Affordability: Ensuring long-term affordability mechanisms and financial support for CLTs will pose challenges.

Perceptions and Acceptance: Changing the perceptions and understanding of CLTs among stakeholders and the general public is crucial.

Land Tenure Systems: Conflicts with traditional land tenure systems will definitely arise, affecting the implementation of CLTs.

Sustainable Financing: CLTs require sustainable financing mechanisms for their operations and maintenance. Sourcing for investors to buy into a long-term repayment plan will be a challenge.

Policy and Regulatory Frameworks: Developing appropriate policy and regulatory frameworks that support CLTs' establishment and operation is essential. There is none today in Nigeria.

Organizational Capacity Constraints: Community organizations may face organizational capacity constraints and require support to overcome these effectively.

These opportunities and challenges associated with CLTs from the perspectives of government officials, housing developers, community organizations, and experts in affordable housing collectively provide a comprehensive view of the potential benefits and hurdles associated with implementing Community Land Trusts in Nigeria's affordable housing landscape.

Analysis of the Current Housing Policies and Regulations in Nigeria Compared to Best Practices in Other Countries.

Analyzing housing policies and regulations in Nigeria and learning from successful practices worldwide is crucial for improving affordable housing provision in the country. Nigeria faces challenges in land acquisition and limited financing options for low-income individuals. Studying best practices from countries like the US, UK, and Canada, which have implemented Community Land Trusts (CLTs), can be valuable. CLTs separate land ownership from housing ownership, ensure long-term affordability, and promote community governance. These countries have also employed effective financing mechanisms, public-private partnerships, and dedicated funding sources. Implementing similar frameworks in Nigeria, such as streamlined land acquisition processes and financial incentives for CLTs, can support sustainable and inclusive housing development, foster partnerships, and empower communities.

Discussion of Findings

The findings of this study shed light on the potential impact of adopting Community Land Trusts (CLTs) into housing policy in Nigeria for the provision of affordable housing and improvement in the quality of life of low-income families. Through a comprehensive analysis of relevant literature, international case studies and stakeholder interviews, several key insights have emerged.

Absence of Established CLTs in Nigeria: The study discovered that, unlike countries such as the United States, the United Kingdom, and Canada, there is currently no known operational CLT in Nigeria. Despite the existence of a conceptual framework by Gusah (2012), there is a significant gap in terms of practical implementation.

Limited Awareness and Perception: The interviews conducted with key stakeholders revealed a lack of awareness about CLTs among government officials, housing developers, and community organizations. Many of the respondents' body language shows that they perceived CLTs as unaffordable and raised concerns about the absence of observable improvements in the quality of life. These factors indicate that the CLT model is not a prominent housing solution in Nigeria's current context.

Policy and Regulatory Frameworks: The study highlighted the importance of tailored policy and regulatory frameworks to support the establishment and growth of CLTs in Nigeria. The comparison of Nigeria's housing policies and regulations with international best practices exposed gaps and areas for improvement. The absence of enabling policies and lack of incentives contribute to the absence of CLTs in Nigeria.

Potential Partnerships and Collaboration: Interviews with stakeholders revealed that potential partnerships between the government, private sector, and community organizations could facilitate the development and management of affordable housing projects through the CLT model. However, the lack of established collaborations and awareness hinder the progress of such partnerships.

Recommendations

The following recommendations are put forward:

The Nigerian government should consider adopting the CLT model into its housing policy to provide access to affordable housing for low-income families. This can be achieved by establishing a policy and regulatory framework that supports the establishment of CLTs in Nigeria, including the establishment of a Community Land Trust Fund (CLTF) and a Land Trust Authority (LTA).

The Nigerian government should consider partnering with the private sector and community organizations to develop and manage affordable housing projects through the CLT model. This will provide funding, technical assistance, and governance support to CLTs.

The Nigerian government should consider addressing the challenges identified in the study, such as resistance from landowners, lack of political will, and capacity building, to ensure the successful implementation of the CLT model in Nigeria.

Capacity building should be provided to community organizations, government officials, and stakeholders on the CLT model and its potential impact on affordable housing and community development.

Further research should be conducted to evaluate the feasibility and potential impact of the CLT model in different regions of Nigeria, taking into consideration the unique cultural, social, and economic contexts of these regions.

Based on the interview responses, the following recommendations are proposed for effective collaboration among government, private sector, and community organizations in developing and managing affordable housing through the CLT model:

Government: Provide policy guidance, create an enabling regulatory environment, streamline land acquisition processes, and offer financial incentives.

Private Sector: Engage housing developers, leverage their expertise and resources, and explore innovative financing models.

Community Organizations: Mobilize community support, raise awareness, facilitate community engagement, and contribute to governance and management.

Collaboration: Foster partnerships, implement cost-effective construction methods, develop mixed-income housing projects, and establish communication platforms for transparency and knowledge sharing.

These recommendations aim to promote the successful implementation of CLTs and address the challenges associated with affordable housing in a collaborative and sustainable manner.

Conclusion

The findings drawn from the extensive examination of pertinent literature sources (Kaczynski & Bowling, 2018; Federici & Kohashi, 2021) resonate in harmony with the valuable perspectives gathered through dialogues with key informants in the locales of Port Harcourt and Lagos. One striking point of differentiation surfaces prominently: the current dearth of established Community Land Trusts (CLTs) designated for affordable housing within Nigeria. This disparity sharply contrasts with the landscapes of countries such as the United States, the UK, and Canada, where CLTs have been successfully instituted to cater to the housing needs of their populations. The evident void in Nigeria's housing framework underscores an unequivocal call for in-depth scrutiny and inquiry, factoring in the nation's unique blend of socio-economic dynamics, political realities, and cultural nuances.

This discernible divergence invites profound contemplation. The absence of established CLTs in Nigeria serves as an embodiment of untapped potential and a canvas upon which innovative possibilities can be painted. In a global context where CLTs have showcased their capacity to provide stable and sustainable housing, Nigeria's unique absence points to an unexplored path. This path, while currently untraveled, presents the nation with an invaluable opportunity to reshape the narrative surrounding affordable housing provision by considering alternative avenues that align more harmoniously with its specific circumstances.

It is within this intriguing contrast that the study finds its core significance. By bringing to light the absence of CLTs in Nigeria's housing landscape, the research serves as a catalyst for a broader discourse—one that acknowledges the complexity of the issue at hand and underscores the importance of tailoring solutions to fit the intricate mosaic that constitutes Nigeria. Thus, the imperative for further exploration and investigation is palpable, driven by the realization that the solutions which have worked for others may need to be recalibrated to suit the multifaceted reality of Nigeria's context. As such, the present study doesn't merely underscore the absence of established CLTs; it illuminates the necessity for a thoughtful, context-sensitive, and collaborative approach to bridge this gap. The study therefore emphasizes the adoption of CLTs in Nigeria for a sustainable solution to the affordable housing crisis and improvement of the quality of life for low-income families.

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Assessing Land Management Strategies and Social Implications of PLAS Beneficiaries in Mahikeng, South Africa

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Abstract

Governments of several countries adopted land reform as a tool to promote equitable land distribution. Whilst this is a welcome development, making the highest and best use of the land by beneficiaries is a matter of concern. Previous studies found nonchalance and improper utilisation of landed property assets among beneficiaries. Thus, this study aimed to analyse the social implications and land management strategies of the PLAS beneficiaries in Mahikeng, South Africa. Data were collected using semi-structured interviews and analysed thematically using Atlas-ti software (version 22). Findings from the interviews confirmed that beneficiaries were acquiring farming skills, taking permissions from the Department before improving the farm's infrastructure, assessing the farm's reproductive value, piping the farm, maintaining the infrastructure, and making boreholes and dams. It was concluded that the social implications of PLAS in Mahikeng municipality included averting social unrest, promoting equity, alleviating hunger, contributing to the food chain and enterprise development, and facilitating practical training. Accordingly, the study recommends that the Department of Rural Development and Lands monitor and evaluate the land redistribution process to ensure that it meets its goals and objectives and identifies any challenges or areas for improvement.

Keywords: Land reform; Strategies to manage real property; Land redistribution; Social justice; South Africa

Introduction

Black South Africans were initially restricted to areas that comprised less than 13% of the country's total land area, thanks to the Native Land Act of 1913 and the Native Trust and Land Act of 1936. Also, they could not purchase property from white people or enter sharecropping agreements under the legal Native Land Act of 1913 and the Native Trust and Land Act of 1936 (Bradstock, 2006; Valente, 2009). However, after the end of the Apartheid government and the country's transition back to democratic leadership, several issues remain unresolved. The democratic government was required, among other things, to address the issue of black people's historically limited access to land (Valente, 2009). Thus, comprehensive land reform was required for South Africa's underprivileged citizens.

Chapter 2 of the 1997 South African Constitution, which comprises the Bill of Rights that backed land reform, was created to solve the issue. Generally, redressing imbalances in the use and management of land calls for a land reform program. Such imbalances occur in different areas, including (1) if the government is finding difficulty in acquiring land for public projects. (2) whenever land is forcefully taken from the citizens or not equitably distributed. While the former

scenario was the case of Nigeria before the enactment of the Land Use Decree (tenurial reform), Number 6 of 1978, now an Act, Cap L5, LFN 2004, the latter was the case of the Fast Track Land Reform Programme (FTLRP) in independent Zimbabwe and the different land reform measures (land redistribution, land restitution and tenure reform), in South Africa.

Land restitution was the primary purpose of remediating the imbalances in independent Zimbabwe. In contrast, land redistribution and land restitution were the primary purposes of correcting the land use glitches in South Africa. Accordingly, various policy reform measures, including (1) Settlement/Land Acquisition Grant (SLAG), (2) Land Redistribution for Agricultural Development (LRAD) Phase I, (3) Land Redistribution for Agricultural Development (LRAD) Phase II, and (4) the Proactive Land Acquisition Strategy (PLAS) were designed to achieve the South African land redistribution and land restitution programmes. Though the first three measures were short-lived because of their limitations, the PLAS scheme introduced in 2006 remains the land reform instrument in South Africa.

The PLAS scheme was created to support economic growth, provide employment opportunities for eligible beneficiaries, and contribute to equitable land distribution (DLA, 2006). However plausible this measure was, the main concern is in the highest and best use of the land by beneficiaries. We consider it an effort in futility if the scheme's objectives are not realised because of ineffective land utilisation. Thus, the case of FTLRP in independent Zimbabwe readily comes to mind, whereby poor agricultural outputs were recorded despite interventions (Mazwi, Chemura, Mudimu & Chambati, 2019). Accordingly, there were studies, including Antwi & Oladele (2013) in Ngaka Modiri Molema District Municipality; Antwi and Nxumalo (2014) in Dr Kenneth Kaunda District Municipality, all in North-West Province, undertaken in the past.

Similarly, Malatji (2017) in Mompani district, and Avhafunani, Simon, Edzisani, Majela & Imke (2017) in Waterberg District Municipality (WDM), all in Limpopo Province did related studies in the past. The focus of these South African studies was primarily on the inability of black farmers to unlock the full potential of land allocated to them due to the lack of support from the state. Again, apart from studies of Antwi & Nxumalo (2014) and Malatji (2017) that analysed the implications of the PLAS scheme on the beneficiaries, other studies dwelt on the three-first schemes. The current study (1) considers the intervening years between the current and previous studies to replicate or otherwise their findings. (2) Looks at the management strategies employed by the PLAS beneficiaries to achieve the scheme's objectives, and (3) ascertain if black farmers can savour the full potential of land allocated to them.

The study is deemed crucial, for it is conducted when land debates have taken centre stage in the country's political environment. Political parties have differing ideologies on the long-standing land challenges facing the disadvantaged black population. Notable among these was the ANC manifesto during the 2019 elections, which bears the party's willingness to correct the imbalances (Christians, 2021). Thus, this study aimed to analyse the social implications and land management strategies of the PLAS beneficiaries in Mahikeng, South Africa. The subsequent sections present the theory and literature review, the research methodology, the presentation and discussion of results, conclusions, and recommendations.

Theoretical Background and Literature Review

This section is divided into four (4), including (1) the theory that underpins this study; (2) the need for land reform; (3) the social implications of land reform, and (4) strategies used by land beneficiaries to manage their assets. Several theories were used to reflect the land reform programme and how it impacts the people. These included (1) indemnity and taker's gain theory captured in Kratovil & Harrison (1954), Denyer-Green (2014) and Kabanga & Mooya (2018), and (2) the Neoclassical theory of land reform reported in Mukarati, Mongale & Makombe (2020), which we found relevant to this study. Few studies tied the Neoclassical theory to land reform, emphasising growth, poverty, and income inequality. The theory sees land redistribution relative to agricultural development and is thus a significant component of the strategy and policy of economic growth (Zahir, 1975).

The PLAS scheme, premised on achieving equity and social justice in South Africa, has benefitted small farmers and landless peasants. Because agriculture is not only a significant source of employment and a means of subsistence for the rural inhabitants in emerging nations, so agricultural growth is essential to economic development. Therefore, land should be valued and distributed following its marginal productivity. This suggests the theory is suitable for addressing complex real-world issues relating to agricultural productivity and land reform. Economic progress depends on increasing agricultural output and securing land ownership. The theory is said to achieve its purpose if the land is redistributed, as is currently happening in South Africa, even though the pace is slow (Ranwedzi, 2013; Antwi & Nxumalo, 2014; Avhafunani et al., 2017; Malatji, 2017).

Therefore, a strategy for economic growth should emphasise the distributive component of the income resulting from the expansion. Therefore, when making policy, consideration should be given to economic disparity, unemployment, and poverty. The redistribution of rural land and ensuing chances for growth have significant long-term effects.

The Need for Land Reform in South Africa

Land reform in the country became fundamental due to the unjust land ownership confusion brought about by apartheid. Thus, the first challenge South Africa's democratically elected government faced in 1994 was addressing the land distribution inequality in the country. As a result, the government launched a complete reform programme on land redistribution backed by the Constitution, demonstrating its commitment to addressing past imbalances and injustices. The country's land reform initiative is built around three pillars (1) land restitution, (2) land redistribution, and (3) tenure reform.

The three pillars of the land reform programme are aptly captured under sections 25(5), 25(6), and 25(7) of the Constitution. Section 25(5) deals with land redistribution, Section 25(6) deals with land tenure security and Section 25(7) deals with land restitution. Section 25(7) of the Constitution states that: "A person or community who has been deprived of the property after June 19, 1913, as

a result of prior racially discriminatory legislation or practices is entitled, to the extent permitted by an Act of Parliament, either to restitution of that property or equitable reparation". Section 25(5) of the Constitution states the responsibility of the state to undertake "reasonable legislative and other measures, within its available resources, to foster conditions which enable citizens to gain access to land on an equitable basis" (Kloppers & Pienaar, 2014).

The third and final pillar of the land reform programme is captured under section 25(6) of the Constitution, which states that: "a person or community whose tenure of land is legally insecure as a result of past racially discriminatory laws or practices is entitled, to the extent provided by an Act of Parliament, either to tenure which is legally secure or to comparable redress" (Kloppers & Pienaar, 2014).

Social Implications of the Land Reform Programme

Land reform transfers ownership or control of land from one group or individual to another, typically to promote a more equitable land distribution or address historical injustices (Chigara, 2019; Chamberlain & Anseeuw, 2019). The government facilitates land acquisition or transfer through various mechanisms, such as land reform programs, land expropriation, or voluntary land sales. The authorities provide financial or technical support to help individuals or organisations acquire or manage the land through subsidies, loans, or training programs. The government monitors and evaluates the implementation of the land reform program to assess its effectiveness and identify any issues or challenges that need to be addressed.

The land reform process is often complex and may involve various actors and stakeholders (Musakwa, 2018). The process needs to be implemented fairly and transparently, with appropriate safeguards and checks in place to protect the rights and interests of all stakeholders (Cousins et al., 2018). Land reform programmes, which are often implemented as part of land redistribution policies, can have various social implications depending on the specific goals and design of the programme and the context within which it is implemented. According to Chigara (2019) and Yang (2021), some potential social implications of land reform programmes include increased access to land.

Musakwa (2018) confirms that land reform programmes can provide individuals or groups previously marginalised access to land, improving their economic and social wellbeing and reducing poverty. Similarly, Sadyohutomo (2018) in Indonesia found that government incentivises farmers to enhance productivity. Thus, land redistribution has halted illegal cultivation, reduced conflict, and improved the income status of the people. In the view of Chamberlain & Anseeuw (2019), land reform programmes can stimulate economic development by providing more people with the opportunity to work and produce goods on the land and by increasing the productivity of the land through improved management practices. Through the facilitation of land reform programmes, Akinola (2020) affirms that it can help reduce social and political tensions by addressing historical injustices or inequalities related to land distribution and promoting a more equitable distribution of land ownership.

Land reform programmes may change land use patterns, as new landholders may choose to use the land differently than the previous owners did. This could have positive or negative impacts on the environment, depending on the nature of the changes and their effects on the land (Adenuga, Jack & McCarry, 2021). The social effects of land reform programs vary depending on the unique conditions, the objectives of the policy, and how the procedure is carried out. It is crucial to carefully analyse the potential social effects of land reform initiatives and work to implement them in a way that advances the general welfare.

Duan (2015) records similar results of farmers' increased food security and income status. In South Africa, large-scale farming without corresponding governmental support is responsible for varied findings in land redistribution programs (Rusenga, 2022; Kirsten et al., 2023). In contrast, to the Indonesian study of Sadyohutomo (2018), the government provides wholesome support to the farmers, leading to a considerable impact on farming practices. The known South African studies included Deninger et al. (2000); Antwi & Oladele (2013); World Bank (2014); Antwi & Nxumalo (2014); Binswanger-Mkhize (2014); Kirsten, Machethe, Ndlovu & Lubambo (2016); Avhafunani et al. (2017); Makombe (2018); Malatji (2019); Zantsi (2019), Amoah & Tyekela 2021, and Zantsi & Nengovhela (2022).

These studies are a significant contribution to the debates on how land redistribution influences the wellbeing of beneficiaries. However, many of these studies focused on the first-three land redistribution instruments in different provinces. Thus a marginal gap still exists to be filled. Antwi & Oladele (2013) in Ngaka Modiri Molema District Municipality (NMMD), Antwi & Nxumalo (2014) in Dr Ruth Segotmosi Mompoti District, and Kirsten et al. (2016) in Dr Kenneth Kaunda District Municipality, were studies done within the same Province of North West, but in different locations to Mahikeng.

Strategies Land Beneficiaries Can Adopt to Manage Assets in Land Ownership

Management of land assets refers to the processes and practices used to use, maintain, and develop land for the benefit of the owner or community effectively and sustainably (Musavengane, 2019). Antwi & Oladele (2013) identified effective planning by selecting crop types or other products in South Africa. Additionally, the land is maintained in a healthy and productive condition through erosion control and other environmental hazards. Also, Ranwedzi (2013) used three case studies to evaluate farm management strategies in Gauteng and found that farmers borrow machines and other implements from neighbouring farms, receive support from the Provincial government and sell cash crops at informal markets.

Aliber & Cousins (2013, and Mudau, Mukonza, & Ntshangase (2018), in a comparative study of Namibia, South Africa and Zimbabwe, report that beneficiaries of land redistribution manage their farmland through training and education on land management practices. The training has shaped land management effectively, leading to improved soil quality and sustainable farming practices. Additionally, the study noted that developing a business plan is another strategy beneficiaries adopt

to manage their farmland to boost income generation. Again, other strategies employed are identifying suitable crops for cultivation and markets for selling farm products.

The practical and efficient management of land assets requires a combination of planning, production, maintenance, development, and governance activities. It can ensure that the land is used sustainably and productively over the long term. It is important for beneficiaries of land redistribution to be proactive in managing their assets and to seek out the resources and support they need to be successful. Adamopoulos & Restuccia (2020) studied the Philippine land reform and found that land beneficiaries seek financial and professional assistance from the government or other organisations to help them manage their farmland effectively. The survey by Akinola (2020) reports the need for beneficiaries to engage the community and build relationships with local authorities and other stakeholders.

Li & Li (2018) surveyed an Illinois farm business to evaluate farm management strategies. The study found that a farm manager's experience and skill are essential to achieving farm productivity apart from farm size. Managers' knowledge and skill could lead to innovative adoption into the farm practice. Thus, from the preceding reviews, differing variables were used to measure farm management strategies; the current study utilised open-ended research that allowed participants to freely express the strategy they employed in achieving their objectives.

Methods

This study utilised qualitative research with a case study design to capture the opinions of ten (10) participants through semi-structured interviews. Five participants were selected from the Department of Rural Development because of their involvement in the land reform processes in Mahikeng municipality. Two of the five participants were chosen from the Strategic Land Acquisition Directorate, which is responsible for buying land under land redistribution. Two participants were chosen from the Property Management Directorate responsible for managing state land. Another official from the Restitution Directorate was chosen to have a mixture of opinions from other relevant directorates.

There are eighteen (18) farm projects under the scheme in Mahikeng with a community of 18 beneficiaries, of which the remaining five (5) participants were part. Two (2) participants (PA1 and PA2) represented themselves and twelve (12) other beneficiaries, while three (3) participants (PA3, PA4 and PA5) represented themselves only (see Table 1). Due to the slower implementation rate of the PLAS scheme, the sampled beneficiaries needed to be more varied. In the past, fewer participants were recorded in similar studies. Ranwedzi (2013) analysed 06 beneficiaries in Mogale City, Gauteng; Antwi & Nxumalo (2014) evaluated 97 beneficiaries in Dr Kenneth Kaunda District, North-West; Avhafunani et al. (2017) and Malatji (2017) used 23 and 18 beneficiaries in Waterberg and Mopani Districts, Limpopo.

The interview session was captured through recording with an audio tape. The researchers transcribed the recorded data into readable notes for ease of comprehension. The transcribed data were linked to the research questions: (1) To what extent have the PLAS beneficiaries managed

their farm effectively in Mahikeng? (2) Has the PLAS beneficiaries' social wellbeing improved since the grant was made to them? The Atlas-ti network diagram was used to convey the results in thematic form. To maintain anonymity, each research participant was assigned pseudonyms (see again Table 1).

Table 1: Participants of the study

Participants	Designation
PA1	Landowner
PA2	Landowner
PA3	Landowner
PA4	Landowner
PA5	Landowner
PA6	Strategic Land Acquisition
PA7	Strategic Land Acquisition
PA8	Property Management
PA9	Property Management
PA10	Restitution Component

Findings

The research results were presented according to the objectives of the study. The researchers explained the thematic analysis through the Atlas-ti network diagram. Thus, the following section presents the results of the study's first objective.

Strategies the Land Beneficiaries Adopt to Manage Landed Property Assets

This section explored how land beneficiaries manage real property assets regarding land ownership or land usage under the lease. The participants' responses to the above research objective are summarised in Figure 1.

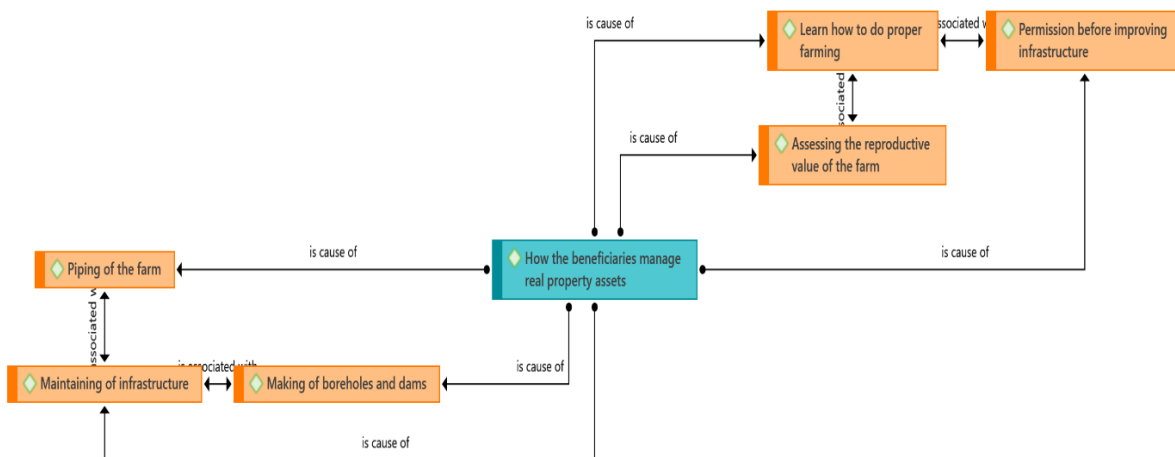


Figure 1: How beneficiaries manage real property assets.

According to Figure 1, the participants agreed that they manage real property assets by learning how to do proper farming, taking permissions from the Department before improving the infrastructure in their farms, assessing the reproductive value of the farm, piping the farm, maintenance of the infrastructure, and making boreholes and dams. Some of the excerpts from the participants are as follows:

PA1 said, "Under land ownership of the real property asset, farmers will be in a much better position and do what works for them at any given time, unlike through the land usage under a lease contract whereby as farmers we are required to request for permission first from the Department before one can improve infrastructure or change land usage for diversification".

PA2 said, "I have conducted a soil analysis study in 2017 to assess the productive value of the farm and have also requested for the mapping of the infrastructure, boreholes, dams, and the piping of the farm, so irrespective of the bundle of rights in place or maybe I should give credit to my knowledge in the corporate world that I have an understanding that this is a business and the management should not depend on either".

PA3 affirmed, "If we could have a secured agreement between ourselves and the Department because now, we hold a caretaker agreement, so we are not sure we can manage the asset better".

PA4 said, "To better manage the real property asset, farmers need to be hands-on full-time, during planting season they need to be present to learn how it is done, infrastructure like water supply fences must be maintained and repaired, irrespective of whether the farm is on title or lease. So that the Department could also realise that the farm is allocated to befitting beneficiaries".

PA5 said, "Farming is a business; farmers must go all out to ensure that the land is productive and that the infrastructure they find on the farm is in a good state. Not only because it is a programme from the government but with having a mind that this is a business on which we survive with the hope that in future one will have a full title of the property". The Department still manages the farmers, transforming them to transition from subsistence farming to commercial farming. That is when we can say that we can allow them to purchase the land, but before these things, the lease would be the most appropriate for our farmers.

Another follow-up question was asked to assess the upkeeping and maintenance of the asset under a lease. The participants' responses are summarised in the Atlas-ti network diagram in Figure 2.

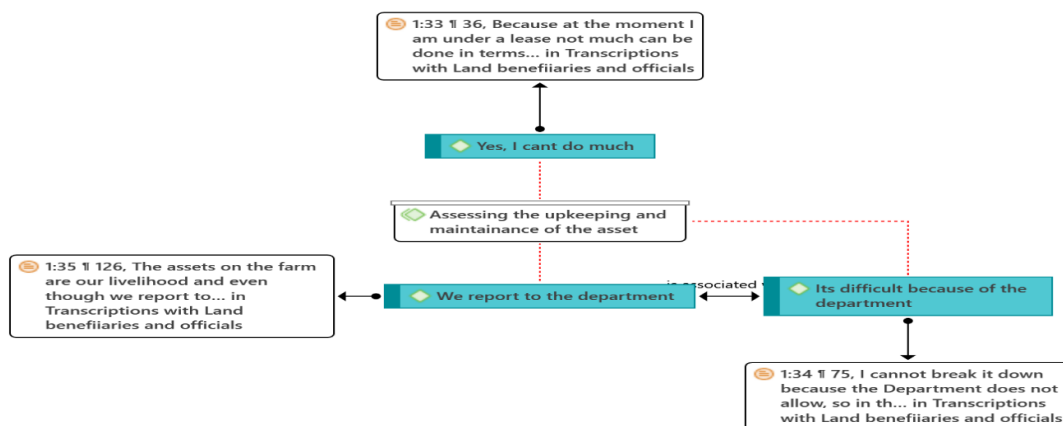


Figure 2: Assessing the upkeeping and maintenance of the asset under lease.

According to Figure 2, the participants agreed they could only do a little since the land was under lease. Another participant said they must contact the Department for approval before going into maintenance. Others confirmed that the maintenance is a tedious process due to the departmental rules.

This section explored how land beneficiaries manage real property assets regarding land ownership or land usage under a lease. According to the findings, the participants agreed that they manage real property assets by learning how to do proper farming, taking permissions from the Department before improving the infrastructure in their farms, assessing the reproductive value of the farm, piping the farm, maintenance of the infrastructure, and making boreholes and dams.

However, the participants agreed they could not be involved in the farm's development since the land is under lease. Another participant said they must contact the Department for approval before going into maintenance. According to Chamberlain & Anseeuw (2019), land assets must be managed effectively and efficiently to be used sustainably and productively over the long term. Confirming this statement, Musavengane (2019) avers that this needs a combination of planning, production, maintenance, development, and governance activities. Beneficiaries of land redistribution should actively manage their assets and look for the tools and assistance they require to succeed.

5.2 Social implications of the land reform programme for Mahikeng residents

This section assessed the social implication of the land reform programme on the people of Mahikeng municipality. The responses of the participants are summarised in Figure 3.

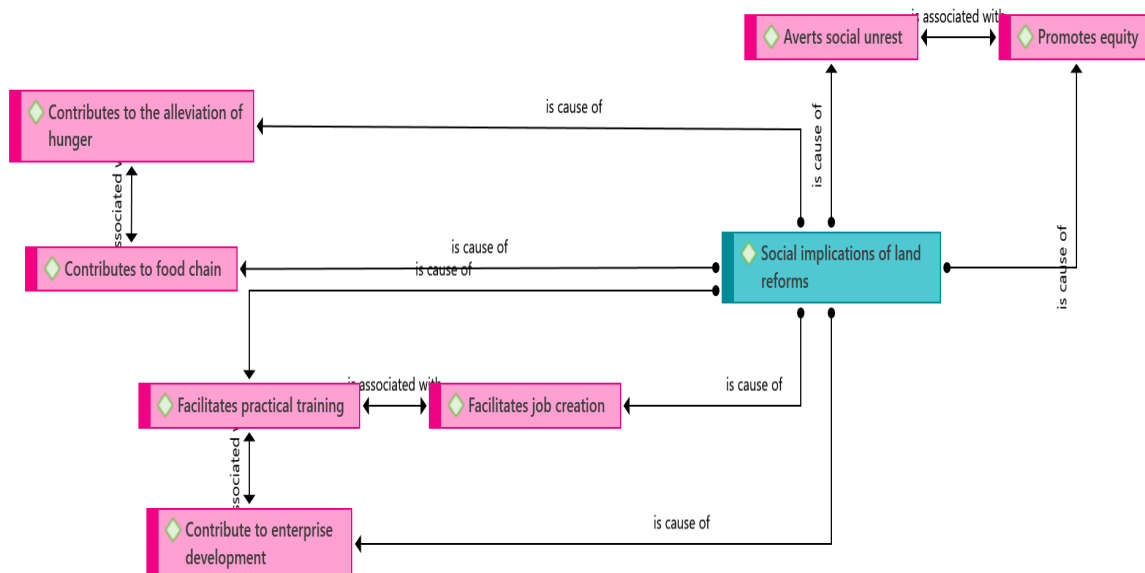


Figure 3: Social implications of land reform

According to Figure 3, the participants confirmed that the social implications of land reforms include averting social unrest, promoting equity, alleviating hunger, contributing to the food chain,

facilitating practical training, facilitating job creation, and contributing to enterprise development. The excerpts from the participants are as follows:

PA1 said, "Job creation as I have employed people from the local area".

PA2 affirmed, "Contributes to the food chain in the area as we are trying to make a living through meat production, and also, we have established vegetable crops on the farm which we sell in the local area".

PA3 said, "The University of North-West in Mahikeng also sends its agriculture students to the farm for practical training".

PA4 affirmed, "In terms of the agriculture transformation chatter, the program mandates the local Agri-industrial cooperatives as part of their mandate to contribute 3% of their net profit for enterprise development and supplier development and transformation of their suppliers change".

PA5 said, "The other one worth mentioning is that the Department, in partnership with the World Food Program in their global hunger alleviation program, and one of the conditions that the Department attached was that they must procure 15% of their goods and services locally".

PA6 said, "Promotes equity through land ownership, reduces poverty, and secures food for poor households. Corrects social injustices and averts social unrest".

PA7 attested, "The social impacts are minimal in that our farmers are not making any social impact on the local economy. They employ foreigners, so the opportunities which would have been meant for locals are being taken by them and do not employ locals, so they are failing to make a social impact in the local economies given these circumstances".

PA9 said, "We need to consider the local social economy and around Mahikeng, there is not much agricultural activity. The area has been mostly turned into residential spaces, and agriculture is still significant".

A follow-up question was asked to know where the beneficiaries operate their farms before going into a lease with the Department. The responses are summarised in Figure 4.

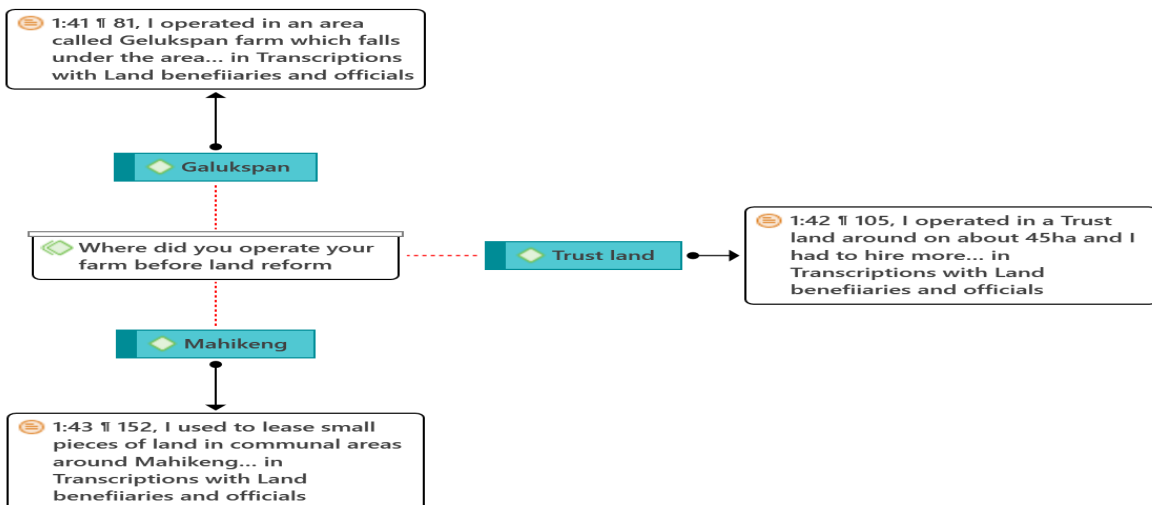


Figure 4: Areas of farm operation before land reform

According to Figure 4, the participants attested that they had operated farms in Galukspan, Trust Land, and Mahikeng. The excerpts from the participants are summarised below.

PA1 said, "I operated in an area called Gelukspan farm which falls under the area of Mafikeng. It was a family-owned farm of 150ha Dryland, I moved to hire more land around the area, and at my peak, I was working 1000ha of mostly belonging to relatives and others communal".

PA2 said, "I operated in an area called Ganyesa before on a piece of land belonging to my grandfather in a communal area under the tribal land".

PA3 said, "I operated in a Trust land around about 45ha, and I had to hire more land from others to increase my production".

PA4 said, "I used to lease small pieces of land in communal areas around Mahikeng".

Another follow-up question was asked to know the markets established by the land beneficiaries since benefiting from the programme. The responses from the participants are summarised in Figure 5.

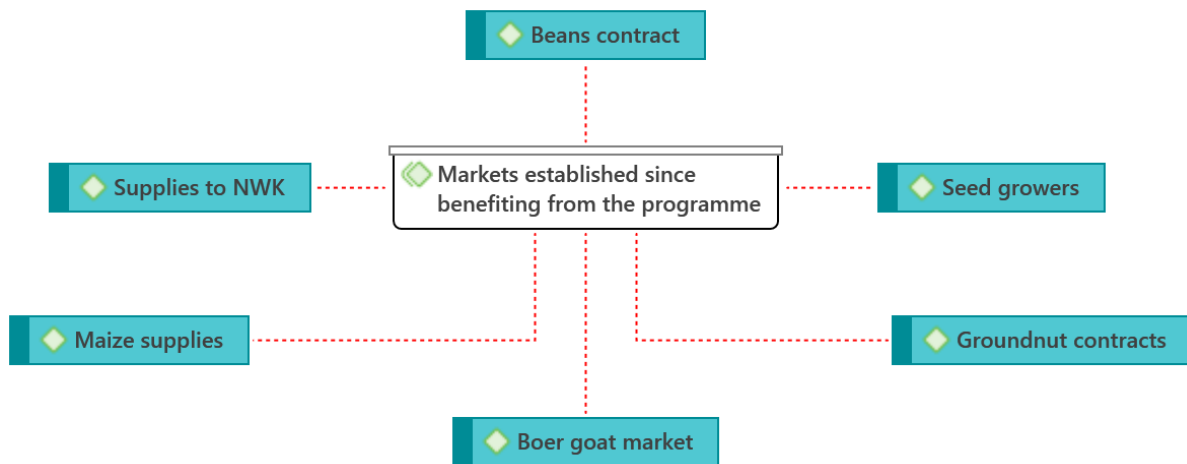


Figure 5: Markets established since benefitting from the lease.

According to Figure 5, the participants confirmed that the markets established since benefitting from the programme include beans contracts, seed growers, groundnut contracts, Boer goat market, maize supplies, and supplies to Noord Wes Koporassie (NWK). This agricultural company sells farm inputs to farmers. The excerpts from the participants are as follows:

PA1 said, "I have a Boer goats' market from Kwa-Zulu Natal and Mpumalanga Province. Being on the farm has enabled me to breed the goats according to the Boer goats' specifications. Accessing the market is much easier, wherein I can control my stock and feed them accordingly. I have been able to tap into the market in other Provinces, unlike when you are farming in communal land".

PA2 said, "I was part of a seed growers' contract of Monsanto, Heineken project on barley contract production. I worked with Omnia in their black farmer commercialisation programme, wherein we persuaded a grain market firm to be appointed with expertise to help design a comprehensive market strategy. I have planted beans on contract, with groundnuts for offtake contracts where the price was

guaranteed. I have worked with the world food program, where I supplied them with 500 ha tons of maize and negotiated a 15% suffix price, and they took care of the transport and storage. In the end, it is all about what is the best mechanisation strategy for my produce".

PA3 attested, "There is only one formal market in the area, so the price is not so good, Suffix price can be low at the time of harvesting, but production inputs like diesel are very high and eats into our profits".

PA4 said, "There is only one common formal market in the area: NWK. I also have Schoeman Boerdery, about 400km from the farm for beans. It is at Delmas, which is very far away in Johannesburg. I also have Roba, where I sell peanuts".

Another probe was made to assess if the skills of the beneficiaries have improved since the lease contract, and their responses are summarised in Figure 6.

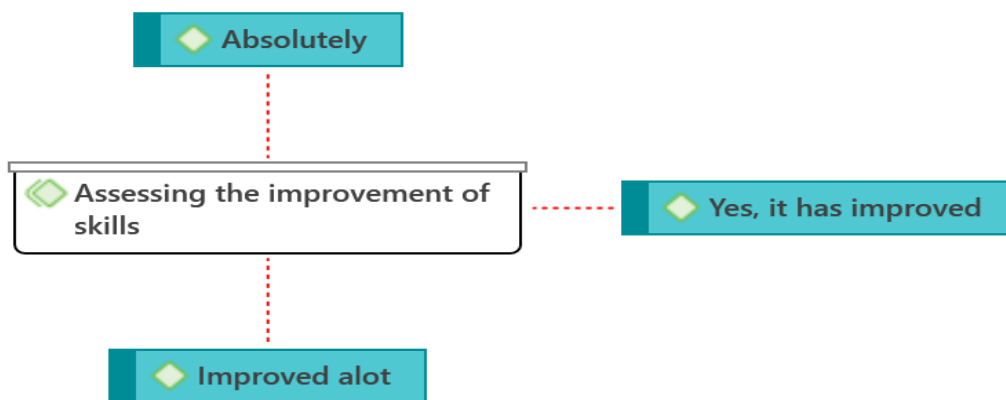


Figure 6: Assessing the improvement of the beneficiaries' skills.

According to Figure 6, the land beneficiaries agreed that their skills have improved since they entered lease contracts with the Department. The direct excerpts from the participants are as follows:

PA1 said, "Yes, I believe so, especially regarding the management of the stock and record keeping. I now understand my expenses and income stream generated".

PA2 said, "Absolutely, my skills have increased".

PA3 attested, "Yes! It had improved a lot because, unlike when I was farming in the Trust land, there was no competition, but being on a proper farm, now I compete with my neighbours and see where I can improve and do better".

PA4 said, "Yes! It had improved a little bit because before, my late husband and son were the ones who were actively involved. Now I must hold the reins, which is still a learning curve; here are some courses I have been attending with the Department of Agriculture".

PA5 said, "Yes! Because now I have my own space where I work".

Another probe was made to know if the income of the leaseholders had increased since getting involved in the lease contract. The summary of the participants' responses is presented in Figure 7.

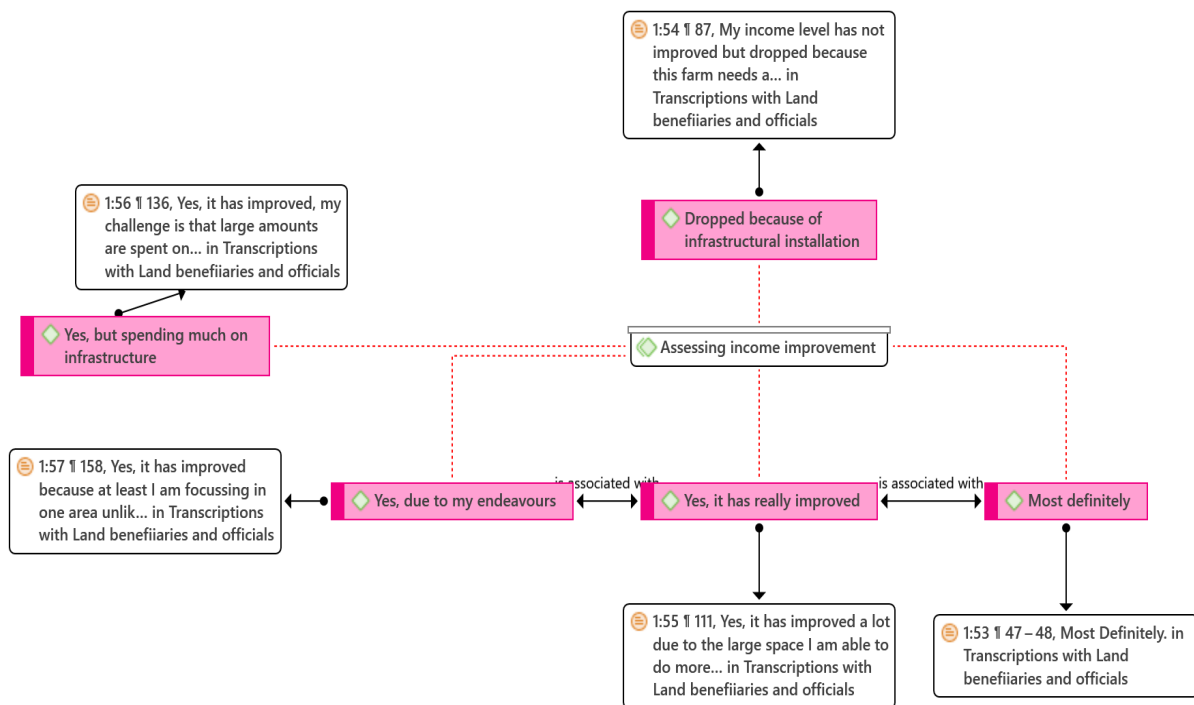


Figure 7: Assessing income improvement of the participants since the lease contract.

According to Figure 10, most study participants attested that their income increased after their lease contract. However, one of the participants confirmed that the revenue dropped due to the maintenance of the infrastructure. The excerpts of the participants are as follows:

PA1 said, "Most definitely, my income increased".

PA2 said, "My income level has not improved but dropped because this farm needs many things. The terrain is rocky, with five different soil types. Since 2014 the farm has been subsidised by income from my other private farm in Gelykspan".

PA3 said, "Yes, it has improved a lot due to the large space. I can do more, and the assistance from the Department contributes to that as well. Back at home, we would borrow money from".

PA4 said, "Most of the agricultural implements that the Department bought from the previous owner are scrap material which I have spent money on trying to repair during planting season".

Discussion of Results

The first objective of this study is to explore the strategies the land beneficiaries use to manage property assets when it comes to land ownership or land usage under the lease. According to the findings, the participants agreed that they manage property assets by learning how to do proper farming, taking permissions from the Department before improving the infrastructure in their

farms, assessing the reproductive value of the farm, piping the farm, maintenance of the infrastructure, and making boreholes and dams. The techniques and procedures used to use, maintain, and develop land for the benefit of the owner or community are the management of land assets (Musavengane, 2019) effectively and sustainably.

Confirming the findings from this section, Mudau et al. (2018) state that beneficiaries of land redistribution can manage land when it comes to land ownership through training and education, develop a business plan, seek financial help, engage the community, seek external funding, maintenance, and development. However, the participants agreed they could not be involved in the farm's development since the land is under lease. Another participant said they must contact the Department for approval before going into maintenance. According to Chamberlain & Anseeuw (2019), land assets must be managed effectively and efficiently to be used sustainably and productively over the long term. Confirming this statement, Musavengane (2019) avers that this needs a combination of planning, production, maintenance, development, and governance activities. Beneficiaries of land redistribution should actively manage their assets and look for the tools and assistance they require to succeed.

The last objective assessed the social implication of the land reform programme on the people of Mahikeng municipality. A "land reform" process involves transferring ownership or control of the property from one group or person to another, usually to promote more fair land distribution or correct historical injustices (Chigara, 2019; Chamberlain. & Anseeuw, 2019). In the empirical study, the participants confirmed that the social implications of land reforms include averting social unrest, promoting equity, alleviating hunger, contributing to the food chain, facilitating practical training, facilitating job creation, and contributing to enterprise development. This conforms to the findings of Chigara (2019) and Yang (2021), who opine that the land reform process can enhance access to land, improve economic development, increase social and political stability, change land use patterns, and reduce potential conflicts and tensions. The participants confirmed that the markets benefitting from the programme include beans contracts, seed growers, groundnut contracts, Boer goat market, maize supplies, and supplies to NWK.

Furthermore, the participants agreed that their skills have improved since they entered lease contracts with the Department. Also, most study participants attested that their income increased after their lease contract. However, one of the participants confirmed that the income dropped due to the maintenance of the infrastructure. The findings in this section prove that the land reform process has improved the economic status of the people of Mahikeng, hence giving them more access to land which might be linked to employment and poverty reduction.

Conclusion

This study explored the social implications of the land reform programme and strategies for managing real property assets. The study adopted a qualitative research method to find answers to the research questions, and this assisted in interacting with the participants, thereby obtaining their opinions. Findings from the study confirmed that the land beneficiaries should adopt the most

effective strategy is to collaborate with the Department of Rural Development and Lands to seek support and technical assistance to develop the properties. The study concludes that the social implications of land reform programmes depend on the policy's specific circumstances and goals and how the policy is implemented. It is essential to consider the potential social impacts of land reform programmes carefully and to ensure that they are implemented to promote the common good of the citizenry.

Recommendations

The study recommends that the land beneficiaries carefully understand the terms and conditions of land ownership and any obligations or responsibilities they may have. After benefiting, they should use a comprehensive plan to make informed decisions about land use. This may involve identifying potential sources of income, such as farming or forestry, or developing a plan for conservation or recreation. They should seek technical support and assistance from the Department, such as training in land management practices or access to financial or marketing resources.

Furthermore, the land beneficiaries should collaborate with their community members to build support and cooperation. Regarding land protection, the beneficiaries should take steps to protect their land from potential threats, such as illegal occupation or environmental degradation. This may involve working with local authorities or community organisations to establish clear boundaries and enforce their rights as landowners. Before developing the assets, land beneficiaries should take permission from the Department before improving the infrastructure in their farms, assessing the reproductive value of the farm, piping the farm, maintaining infrastructure, and making boreholes and dams. Regarding discord, disputes, or misconceptions, they should seek legal assistance and clarification to ensure their rights are protected.

The Department should also monitor and evaluate the land redistribution process to ensure it meets its goals and objectives and identify any challenges or areas for improvement. Also, the Department should foster sustainable land use practices to benefit the environment and local communities. This may involve training new landowners in sustainable agriculture or forestry practices. The Department should assist in the production inputs, interviewing and allocating farms, empowering handicapped farmers, facilitating rural development, marketing the farmers' produce, equitable distribution of land, and monitoring of projects. The Department should also assist small-scale farmers, embark on regular monitoring and evaluation, provide training, and support production.

Disclosure Statement

No potential conflict of interest was reported by the authors.

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Evolution and the future of compensation for expropriation in Zimbabwe: A historical review

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Abstract

Zimbabwe has a rich history of compulsory land acquisition, dating to the origins of colonial rule in 1890. This history is documented in policy documents, print and social media, and academic publications. However, to the researchers' knowledge for a complete history of the trajectory followed by the laws guiding expropriation and compensation from 1890 to 2022, multiple sources must be consulted. Currently, limited work (if any) does not provide a complete picture of the genesis/evolution of statutory compulsory land acquisition laws covering the entire period. Thus, the purpose of this study was to provide a complete history of compensation for expropriation in Zimbabwe while pointing out issues relative to equity and natural justice that occurred during the period under review. This paper was based on desktop research from 2018 to 2023. Documents which included statutes and government policies were obtained online from the official websites of government institutions. Systematic content analysis was adopted, and data coding was done manually based on themes derived from the data. The findings of this study supported the view that compensation for expropriation in Zimbabwe is complex and the international community can help to bring closure to the issue.

Keywords: Compensation, Evolution, Expropriation, Properties, Zimbabwe

Introduction

A lot of ink was invested in trying to answer the question: are expropriation laws in Zimbabwe fair? This question is also related to another question, is expropriation without compensation for land fair? These questions are complex, and the subject is emotional, hence unravelling it objectively is a daunting task. It is important to note that in as much as there exists a vast literature on compensation for expropriation the world over and the same subject has been extensively documented in Zimbabwe (Madhuku, 2004; Mlambo, 2005; Nmoma, 2008; Magaisa, 2010; Paradza, et al, 2021, Zulch, et al, 2022; Yacim, et al, 2022), there is no single document that provides a compendium of the evolution of compensation for expropriation in Zimbabwe. As such, one is forced to read several sources to get a complete picture. This study seeks to give a complete history of compensation in Zimbabwe from 1890 to 2023 to unravel the complexity of the subject and suggest a way forward. Specific objectives of this paper are to (1) identify statutory provisions guiding compensation for expropriated properties in Zimbabwe, (2) describe how the statutory provisions evolved from 1890 to 2023 and (3) explain the significance of the history of statutory provisions guiding compulsory acquisition and compensation on the current compensation dispute in Zimbabwe. The meaning of words differs with place and time; hence it is imperative to define key terms. Expropriation which is also known as compulsory land acquisition is used in this paper to mean the act of acquiring private land by the government without the owners' consent. The dictionary definition of compensation was adopted which is "something, typically money, awarded to someone in recognition of loss, suffering, or injury". In this case, compensation for expropriation means a monetary or nonmonetary award that is offered for the loss of land

and/or land rights. Lastly, the evolution of expropriation means the gradual development of expropriation over the history of Zimbabwe.

Literature Review

The government is empowered to limit private property rights for the common good (benefit) of the public. Expropriation, also known as compulsory land acquisition, is using the ‘visible hand’ (government powers) to correct some of the limitations of the market economy (invisible hand) in the land market. Many scholars agree that compulsory land acquisition is on the rise due to industrialization and urban development (Mteki, Murayama and Nishikizawa, 2017; Tagliarino, Bununu, Micheal, De Maria and Olusanmi, 2018; Cao and Zhang, 2018; Adam, 2018; Ahmed, Kuusaana and Gasparatos, 2018; Abate, 2019; Wang, Li, Xiong, Li and Wu, 2019; Daniel, Nkup, Samson and Wuyokwe, 2020; Williams, Brown, Agrawal and Guikema, 2021; Tuan, 2021a; 2021b; Kieti, 2021; Marewo, Ncube and Chitonge, 2021; Liu and Lo, 2022). An increase in expropriation has also seen a rise in the number of affected people, which explains why the subject has attracted the attention of policymakers and academics worldwide.

Studies have shown that affected people are affected negatively by expropriation projects due to under-compensation for expropriated properties in China (Tong, Zhu and Lo, 2019). However, there is also evidence to show that over-compensation impacts the entrepreneurship decisions of displaced people (Agegnehu and Mansberger, 2020) because it causes challenges like impulse spending and gambling (Bao, Dong, Jia, Peng and Li, 2020). In this case, one might be tempted to conclude that overcompensation can be a curse because it can bring behaviour that is anti-entrepreneurial and difficult to sustain and might result in other social ills like theft and prostitution in future. These findings also suggest that neither under-compensation nor over-compensation works well for people affected by compulsory land acquisition. Therefore, it is paramount for the expropriating authority to pay fair compensation to the displaced people.

Some studies on compensation for expropriation concluded that people who are displaced by expropriation are not satisfied if they are not consulted during the expropriation process (KhanYoshida, Katayanagi, Hotak, and Caro-Burnett, 2021) or when their livelihoods are eroded due to under compensation and/or delayed compensation (Tuan, 2021a; 2021b; Kebede, Tesfayand Eman, 2021). Obineme, Udobi, and Ifediora (2021) posit that if the expropriation process is delayed, affected people make more improvements that the expropriating authority disregards when calculating the compensation amount. One might be tempted to argue that it is fair for the expropriating authority to disregard any improvements done after the expropriation date. This argument can be if the expropriation process is finalized timeously. However, if there are delays in the process, this line of thinking might be challenged on the grounds that life does not stop simply because the government intends to take one’s land. For example, in the Zimbabwean case where the whole expropriation process took two decades, households could have grown if affected people were not evicted, hence the requirement for new improvements. If this is the case, then why should one be punished for improving his/her property?

People affected by expropriation projects can also be dissatisfied if they are impacted by the negative externalities like pollution (air, water, land, noise) emanating from projects implemented on expropriated land (Lekgori, Paradza, and Chirisa, 2020; Prosper, 2021). Even though expropriation laws in many countries provide for compensation for injurious affection under heads

of claim, it might be easy to estimate where land value decreases. There might be complexities where there are negative externalities, but land values do not change, even though its compensation might be covered under other reasonable expenses, it might be difficult to quantify the loss. A recent study in Côte d'Ivoire by Effossou, Cho and Ramoelo (2022) cited conflicts between customary and modern (statutory) land tenure systems as one of the challenges faced during expropriation and compensation. Wang et al. (2019) concluded that expropriation has a negative impact on the health of affected people due to emotional and financial strain.

Furthermore, compensation disputes emanate from "... misunderstandings on the procedures used, expropriation speed, compensation rates used and the existence of substandard living conditions in the resettlement areas" (Ndjovu and Manirakiza (2013). The following are some of the effects of expropriation on affected people: "family disunity, congestion, dust evading rooms due to partial demolition of the habitable house, loss of business customers and profits, general insecurity and difficulty in renting new accommodation" (King and Sumbo, 2015). According to Ndjovu and Manirakiza (2013), failure to identify and address these issues causes disputes between the affected people and the expropriating authorities. In view of the foregoing discussion, it can be noted that compensation disputes can be attributed to issues ranging from under-compensation to bad governance, misunderstanding of the expropriation procedure, ambiguous laws, and negative externalities caused by the development projects.

Museleku (2021) pointed out that property valuers can also contribute to the under-compensation of affected people if they have a limited understanding of local and international laws guiding property valuation for compensation. The author went on to point out that, in some cases, valuers were leaving out certain assets in their valuation reports due to a narrow interpretation of the law. To add more, corruption by officials from the expropriating authority also plays a pivotal role in the under-compensation of affected people (Adigeh and Taffse, 2021). According to Paradza, Yacim and Zulch (2021) the compensation dispute in Zimbabwe was compounded by the fact that valuation for expropriation was a mammoth task since some of the improvements to be valued were vandalized during and after the violent fast-track land reform programme. Chimbetete (2016) is of the view that the complexity of valuation for compensation in Zimbabwe was made complex by the scarcity of data, which is scattered in different offices hence the property valuers relied on assumptions for some value-making variables.

Downing, Shi, Zaman, and Garcia-Downing (2021) and Khan et al. (2021), emphasise the need for post-relocation support to affected people to restore them to their previous livelihoods. This school of thought may resonate well with the principle of indemnity, which stipulates that affected people must be given compensation that restores them to where they were before the expropriation. Restoration of displaced people should include post-compensation support for affected people, especially through education about investment and entrepreneurship (Dires, Fentie, Hunie, Nega, Tenaw, Agegnehu and Mansberger, 2021).

It is important to note that the assessment of the satisfaction of affected people is not an event, but it should be a process to be done in three different stages. According to Cao and Zhang (2018), the first stage is to be done prior to the compulsory acquisition process, the second is to be done during the actual expropriation process and post-compensation is the last stage of assessment for satisfaction. Having reviewed literature related to the subject under study in this section, the next section discusses the methodology adopted for this study.

Theoretical framework

This paper is underpinned by the theory of equity and equivalence (also known as the principle of indemnity) which stipulates that people affected by expropriation projects are not supposed to suffer or benefit from the expropriation. In other words, the restitution paid expropriation-induced losses must be equivalent to the losses suffered as illustrated in Figure 1.

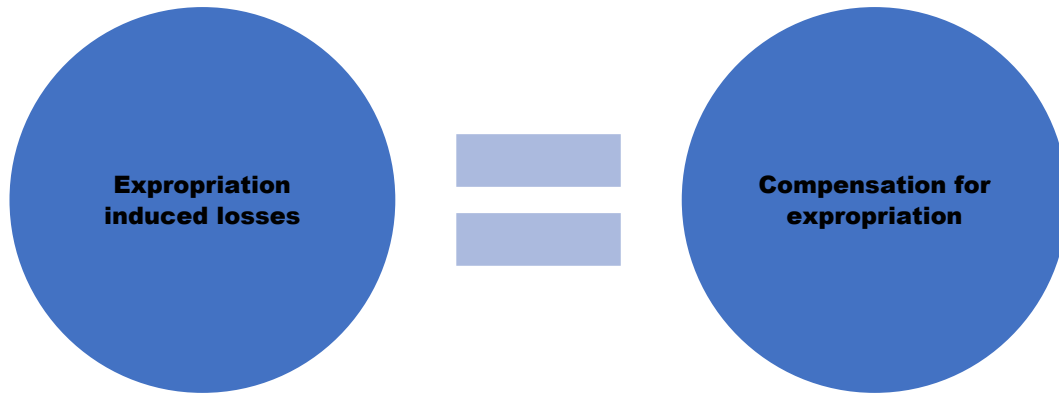


Figure 1: The concept of Equity and equivalence

As illustrated in Figure 1, the reasoning behind the theory of equity and equivalence is that private individuals whose land is expropriated for public interest must not carry the burden for such public benefit. Hence, they must be left where they were before their land was expropriated. At the same time, the public (government) must not pay more than what the affected person has lost in the form of overcompensation. Overcompensation will mean that the affected persons by the expropriation are benefiting from public resources at the expense of the public which is against the principle of indemnity.

Methods

This study seeks to answer the questions (1) How did the laws guiding compensation for expropriation evolve from 1890 to 2023? (2) Has the evolution of laws guiding compensation for land expropriation in Zimbabwe contributed to the current land compensation disputes?

An in-depth literature review was adopted, and documents were accessed and analyzed between 2018 and 2023. Documents which included statutes and government policies were obtained online from the official websites of government institutions. Furthermore, academic publications on policies and laws on compensation for expropriation in Rhodesia and in Zimbabwe were reviewed. Systematic content analysis was adopted, and data coding was done manually based on themes derived from the data.

Findings

This section is structured into 2, the first subsection reviews literature from 1889 to 1980 and the last subsection reviews literature from 1980 to 2023.

Policy and Legal Framework Guiding Expropriation and Compensation during the Colonial Era 1889 - 1980

According to Pazvakavambwa and Hungwe (2009) and Nyandoro (2012), expropriation without compensation in Zimbabwe started around 1889. Many scholars posit that the Royal Charter of Incorporation which was granted to the British South African Company (BSAC) in 1889 is the mother of expropriation without compensation (UN, 1975; Houser, 1977; De Villiers, 2003; Madhuku, 2004; Pazvakavambwa and Hungwe, 2009; Ndulo, 2012) because it gave the BSAC powers to expropriate land from Africans for the benefit of white settlers (Madhuku, 2004). Bonarjee (2013) and De Villiers (2003) concurred that the settlers went on to expropriate three-quarters of the productive land from Africans between 1890 and 1902.

According to Madhuku (2004), World Bank (1986) and Stapleton (2016), when Zimbabwe was colonized in 1890, the colonizers passed laws that took away the rights of native people to have access to land and natural resources. Rorder (1964) posits that:

“...during the first decade after the occupation much African land was alienated to whites ...whites were able to take any land they desired, regardless of its African population.”

As compensation for their expropriated land, the natives were resettlement in inhabitable reserves which were remote, arid and tsetse infested (Moyana, 1975; World Bank, 1986; Mbiba, 2001; Mlambo, 2005; Hove and Gwiza, 2012; Gwekwerere, Mutasa and Chitofiri, 2017). According to Madhuku (2004), these Reserves were established on land which was owned by the BSAC and Africans only had use rights.

According to Madhuku (2004), Mlambo (2005), Nmoma (2008) as well as Magaisa (2010), the judgement of the Privy Council of 1918 on Zimbabwean land ownership has sown the seed of expropriation without compensation. The case in question was who owns the land in Southern Rhodesia (Zimbabwe) between the natives, the BSC, and the Crown (De Villiers, 2003; Magaisa, 2010; Moyo, 2016). The Privy Council ruled that the rightful owner of the disputed land was the Crown (Magaisa, 2010; Moyo, 2016). This disposal of land from natives was further buttressed by the provisions of Section 49 of the Southern Rhodesia Constitution Letters Patent of 1923 which assigned all African land under the ownership of the Crown which was to be administered by the Governor in Council (British Government, 1923; Mlambo, 2005; Nyambara, 2010; Nyandoro, 2019).

According to Worby (2001), and Thomas (2003) Expropriation in Southern Rhodesian was guided mainly by the Land Apportionment Act of the early 1930s, the Native Land Husbandry Act of 1951, and the Land Tenure Act of 1969. These laws were discriminatory in nature as productive land was allocated to whites while Africans were relegated to less productive areas (Utete, 2003, Pazvakavambwa and Hungwe, 2009; Chivandi, Fushai and Masaka, 2010; Moyo, 2011; Nyandoro, 2012; Hove and Gwiza, 2012; Manjengwa, Hanlon and Smart, 2014; Tom and Mutswanga, 2015).

Multitudes of Africans were disposed of their prime customary land (Floyd, 1962; Ndulo, 2010; Musemwa and Mushunje, 2011; Basure, Nhodo, Dube and Kanyemba, 2011) when the Land Apportionment Act of 1930, the Native Land Husbandry Act of 1951 and the Land Tenure Act of 1969 (Houser, 1977; Madhuku, 2004; Mlambo, 2005; Nmoma, 2008; Hove and Gwiza, 2012; Masengwe and Dube, 2021) were passed as well as after World War 2 when the land was used to compensate the veterans of the same war under the Land Acquisition scheme of 1945 (Mataya, Gondo and Kowero, 2003; Mlambo, 2005; Musemwa and Mushunje, 2011; Nyandoro, 2019).

From the foregoing review, it can be noted that what was being referred to as white land was land that belonged to Africans, but it was taken away from them by their colonial masters. The land was grabbed from natives who were considered uncivilized nomads with no fixed boundaries (Rorder, 1964). Furthermore, Africans were forced to sell their animals at very low prices as guided by the provisions of the Native Land Husbandry Act of 1951 (Weinrich, 1977; Houser, 1977; Drinkwater, 1989; Madhuku, 2004; Njaya and Mazuru, 2010). It is therefore important to bear in mind the fact that any solution to the centuries-long compensation dispute in Zimbabwe goes beyond compensation for land. However, bringing in issues like under-compensated livestock compounds the complexity of the compensation issue since there are no records of what transpired during the whole expropriation process. The researchers tried to dig for any valuable data from Zimbabwe's National Archives and did not find anything valuable on the subject area.

Compensation for expropriated land has been a thorny issue that culminated into fifteen years (1964 – 1979) (UNDP, 2002) and was on top of the agenda during the Lancaster House Conference of 1979 negotiations which brought about the Zimbabwean independence (Manjengwa, Hanlon and Smart, 2014). Magaisa (2010) posits that no lasting solution has been found to resolve land contestation issues in Zimbabwe decades after independence. This situation has not changed thirteen years after this publication by Magaisa (2010) and it looks like a solution might not be found any time soon. In view of the foregoing review, it is evident that Africans were victims of expropriation without compensation or under-compensation during the colonial era. The government of Zimbabwe attempted to cure this colonial-induced illness, but its prescribed medication partially cured the ailment and has side effects that require treatment as shall be discussed in the next section.

Policy and Legal Framework Guiding Expropriation and Compensation after Independence: 1980 to 2023

According to UNDP (2002), Shaw (2003), and Pilosof (2012), when it inherited the country from its former colonial masters, the Government of Zimbabwe was faced with a mammoth task of repealing and replacing all discriminatory land laws. After independence in April 1980, the initial foundation of the legal framework guiding compulsory acquisition and compensation was laid by the first constitution of an independent Zimbabwe (popularly known as the *Lancaster House Constitution of 1980*). This constitution was a product of the *Lancaster House Agreement* (the agreement) of 1979 (Ndulo, 2010) that ended the fifteen years of the armed struggle between former colonial masters and the revolutionary armies.

One of the conditions of this agreement which was incorporated into Section 16 of the *Lancaster House Constitution* of 1980 was that prompt and adequate compensation was to be paid for expropriated properties based on market value (Palmer, 1990; Madhuku, 1999; UNDP, 2002; Moyo, 2006; Njaya and Mazuru, 2010; Moyo, 2011; Hove and Gwiza, 2012). The same section also allowed compensation to be paid in foreign currency (Mlambo, 2005) in an offshore account of the affected person's choice without any deductions (Madhuku, 1999). This law, based on a willing buyer willing seller principle (Nyandoro, 2019; Mutema, 2019), was problematic since landowners offered unproductive land at inflated values (UNDP, 2002; Pazvakavambwa and Hungwe, 2009). Magaisa (2010) argued that the willing buyer, willing seller model failed to work because it was based on the willingness of those with land to offer it and on the ability of the government to pay compensation at market value.

According to Palmer (1990), Madhuku (1999), and Magaisa (2010), Section 16 of the *Lancaster House Constitution* of 1980) was protected for the first ten years of independence. In 1982 the *Communal Land Act* (Chapter 20:04) was passed, renamed formerly tribal trust land into communal (Government of Zimbabwe, 1982) land as defined by Section 3 of the same statute. As discussed before, people occupying tribal trust lands lost their customary land without compensation during the colonial era. One would expect the Zimbabwean government as it was working to reverse the ills of colonial rule through land reform and resettlement to give people in formerly tribal trust lands. It is known where these people were displaced from and how they lost their ownership rights.

However, instead of addressing this issue through an Act of Parliament, the *Communal Land Act* (Chapter 20:04) did little to compensate people displaced during colonial rule. This is coupled with the fact that the post-independence land reform also did not bring restitution to occupants of communal land. Furthermore, no statute brings ownership rights to people who lost their ownership rights during the colonial period since communal land is vested in the President in terms of Section 4 of the *Communal Land Act* (Chapter 20:04) of 1982. It can be inferred that statutory provisions of the *Communal Land Act* (Chapter 20:04) of 1982 are similar to those of the *Tribal Trust Land* of 1979, where occupants have use rights without ownership rights. Any debate on fair compensation for compulsory land acquisition cannot be complete without addressing issues surrounding victims of the pre-independence displacements.

Yacim, Paradza and Zulch (2022) noted the death of statutory guidelines for valuing expropriated communal properties. Given the foregoing, one might argue that people who were disadvantaged by colonial statutes are still to receive restitution and, at the same time, do not have enough protection from existing laws when their properties are to be expropriated.

According to Chivandi, Fushai and Masaka (2010), in 1985, the *Land Acquisition Act* (Chapter 20:10) was passed, and its Section 29 was a replica of Section 16 of the *Lancaster House Constitution of 1980*. Madhuku (2004) postulated that before 1985, compensation for expropriation was guided by the Land Acquisition Act of 1979, passed during the short-lived Zimbabwe-Rhodesia. Section 29 of the *Land Acquisition Act* of 1985 stipulated that whenever land was to be expropriated, then prompt and adequate compensation was supposed to be paid on or before the expropriation date. Promptness can be interpreted to mean that the compensation was to be paid without delay. Based on this same definition then, when there were delays in payment of compensation, then interest and interest are to be paid to compensate for the time value of money. Adequate compensation stems from the principle of equity and equivalence, which states that people affected by an expropriation project must be compensated for exactly what they have lost, nothing more, nothing less. Said in other words, they are not supposed to gain or lose because their properties are expropriated for use that benefits the public. Of interest in these statutory provisions is the fact that during the time in question, the land was needed for the resettlement of Africans who were disposed of their land without compensation during the colonial era. Therefore, any yardstick used to measure fairness in the compensation process has to go beyond what the current affected people were losing and must be broad enough to include previous landowners who lost the same land without compensation.

Soon after the expiry of statutory provisions of Section 52 of the *Lancaster House Constitution* of 1980 in 1990, in the early 1990s, the Zimbabwean government amended Section 16 of the *Lancaster House Constitution* of 1980 and repealed the *Land Acquisition Act* of 1985 (Ng'ong'ola, 1992; Moyo, 2000; UNDP, 2002; Thomas, 2003; De Villiers, 2003; Chivandi, Fushai, and Masaka;

2010; Njaya and Mazuru, 2010; Gwekwerere, Mutasa and Chitofiri, 2018). According to De Villiers (2003), the overall aim was to simplify compulsory acquisition and speed up the resettlement process. However, some scholars criticized some legal provisions which denied affected people the right to challenge the expropriation and compensation in a court of law (Ng'ong'ola, 1992; Madhuku, 1999; Magaisa, 2010).

The Government of Zimbabwe expropriated commercial farms in early 2000 without following the legal process (Cliffe, Alexander, Cousins and Gaidzanwa, 2011) in a bid to accelerate the acquisition of vast pieces of land and distribute it to multitudes of the indigenous landless (UNDP, 2002; De Villiers, 2003; Moyo, 2006; Pazvakakavambwa and Hungwe, 2009; Moyo, 2016). Section 16 of the *Lancaster House Constitution of 1980* was amended in the early 1990s through the *Constitution of Zimbabwe Amendment Act (Number 11) Act number 30* of 1991 (Madhuku, 1999; UNDP, 2002; Magaisa, 2010). This amendment changed the wording of Section 16 of the *LHC of 1980* from prompt and adequate to fair compensation which is paid over a reasonable period (Madhuku, 1999; De Villiers, 2003; Magaisa, 2010).

Following the *Constitution of Zimbabwe Amendment Act (Number 11) Act number 30 of 1991*, the *Land Acquisition Act of 1985* was repealed (Moyo, 2000; Thomas, 2003; De Villiers, 2003; Moyo, 2006; Chivandi, Fushai and Masaka, 2010) and replaced by the *Land Acquisition Act of 1992* through the *Land Acquisition Act Amendment (number 3)* of 1992 (De Villiers, 2003; Moyo, 2006; Nmoma, 2008). According to De Villiers (2003) and Moyo (2006), the *Land Acquisition Act of 1992* was crafted in line with the *Constitution of Zimbabwe Amendment Act (Number 11) Act number 30 of 1991* which departed from market value and adopted fair value for compensation. Another notable change brought by Section 29 of the *1992 Land Acquisition Act (Chapter 20:10)* is that it gave the mandate of determining the compensation value to the Compensation Committee (De Villiers, 2003; Chivandi, Fushai and Masaka, 2010).

The *Constitution of Zimbabwe Amendment Act 5* of 2002 and the *Land Acquisition Act Amendment 15* of 2000 transferred the responsibility of compensation for agricultural land expropriated during the Land Reform Programme to the British Government while the Government of Zimbabwe remained with the mandate to pay restitution for improvements on the land (Villiers, 2003; Moyo, 2006; Pazvakakavambwa and Hungwe, 2009; Magaisa, 2010; Moyo, 2016). These amendments might be justified by the need to give back land to Africans who lost the same without compensation. Speeding up the land distribution process was necessary, and the government of Zimbabwe might be right to deny compensation for the land which was taken from its people without compensation. However, there is a problem with a blanket assumption that all foreign nationals who were owning land benefited from colonial rule. According to Pilosof (2012), there is ample evidence showing that some farmers who lost their land during the fast-track land reform programme bought their farms after independence. The question then is why should a farmer who bought her/his farm after independence and did not benefit from the farms expropriated during the colonial era not get her/his compensation from the government of Zimbabwe? At the same time the first question still stands, why should the government of Zimbabwe pay for the land that was taken from its people without compensation? Whether the current farmer bought the farm in the open market or not does not change the fact that when the land was taken no compensation was paid. This equation can only be solved if the architects of colonialism accept responsibility of compensation for the effects of what happened during the years of colonial rule.

In 2013, Zimbabwe replaced the *Lancaster House Constitution of 1980* with the *Constitution Amendment (number 20: Act 1)* of 2013. According to Moyo (2016), Sections 72 and 295 of the new constitution replicate the provisions of the *Constitution of Zimbabwe Amendment Act 5* of 2002 specifically on non-compensation of land when it is expropriated for land resettlement. The Constitution of Zimbabwe of 2013 is very clear that compensation of land is to be paid by former colonial masters referring to the British Government. However, the former colonial master is not committing himself to pay the compensation for the expropriated land. This has left affected people with nowhere to go for compensation of their lost land. Therefore, even if the Government of Zimbabwe is going to pay the agreed compensation in terms of the Compensation Deed of Agreement, it might not bring a closure to the compensation dispute.

Paradza, Yacim and Zulch (2022) noted ambiguities in the Land Commission (Gazetted Land) (Disposal in Lieu of Compensation) Regulations of 2020 that were meant to provide for indigenous and foreign persons (protected by investment agreements prior to the expropriation) to apply and regain the title of their former properties. They concluded that any compensation done in terms of the same regulations will result in under-compensation and hence might not achieve the intended purpose.

The Future of Compensation for Expropriation in Zimbabwe

A solution to the lingering expropriation of Zimbabwe needs the involvement of the British Government. The former colonial master benefited from colonial policies and hence master take responsibility when a solution is sought to reverse the ills of the same. Any lasting solution should go beyond compensation for former commercial farmers who lost their land during the fast-track land reform programme. It must go as far back as 1890 and all victims of expropriation without compensation must be identified and compensated. Even though the Government of Zimbabwe succeeded in acquiring farms from former commercial farmers and resettling multitudes of Aborigines, some of the people who lost their land during the land reform programme did not benefit. This is compounded by the fact that there is no law that provides for natives who lost their land during the colonial period.

Unlike former commercial farmers whose compensation for land is said to be paid by the former colonial masters, the Zimbabwean constitution is silent on compensation for Aborigines who lost their land in the same fashion as the former commercial farmers during the colonial period. One might say those who benefited from the land resettlement programme have already received their compensation. Even where they benefited from the resettlement programme, to say that they received full compensation is against the spirit of indemnity. These people have lost access to their land for centuries hence just returning the land cannot be considered as adequate compensation. What about the delay in returning the use rights and the loss of land written all this long? One is justified to argue that these people deserve to be compensated for that.

Conclusion

Two research questions guided this study (1) how do the laws guiding compensation for expropriation evolve? (2) Has Zimbabwe's expropriation and compensation laws contributed to the current land compensation disputes? Thus, the initial laws were a creation of the colonialist skewed

in their favour to the exclusion of the black Zimbabweans. Redressing these imbalances after independence led to more complex problems. Accordingly, victims of colonial laws are yet to be compensated, and regrettably, more victims were added to the existing list after independence. This study recommends that future research could be done to seek the views of people who lost their land before and after independence and come up with an acceptable compensation framework. Also, Zimbabwe and its former colonial master are important stakeholders when trying to digest the complexity of compensation for expropriation in Zimbabwe. Therefore, the international community has a role to play if an answer to this issue is to be found in the future. Given the matter's sensitivity, it will be a mammoth task, but it must be done soon because delays can result in more victims, and the issue will be further intertwined.

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No potential conflict of interest was reported by the authors.

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Wetland gentrification in African cities: Implications for sustainable property development

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Abstract

There is growing scholarly interest in notions of green gentrification in the global North, which explores how environmental improvement in gentrifying districts drives up real estate prices and subsequent displacement of low-income residents. Although similar processes of increasing demand for property development and its attendant displacement of urban wetlands is occurring in African cities, previous research have simply conceptualized it as wetland encroachment and not as a form of gentrification. The objective of this article is to re-conceptualize the dynamics of wetland encroachment in African cities within the broader conception of gentrification and analyze its implication for sustainable property development. Drawing on insights from extant literature on African urbanism, wetland encroachment and gentrification, we term the African variant of green gentrification as ‘wetland gentrification’. Wetland gentrification occurs when customary authorities, amid land scarcity and rising property values, alienate wetlands in urban neighbourhoods. Property development practices, typically by high-income earners and private developers, on urban wetlands lead to the displacement of the ecological resources and subsequently poor households and settlements through urban flooding. We frame wetland gentrification as tantamount to unsustainable property development because it deteriorates water quality and ecological lives, causes urban flooding, and deepens urban poverty.

Key words: Urban Wetlands; Wetland Gentrification; Green Gentrification; Sustainable Property Development; African Cities

Introduction

Wetlands are globally described as a type of ecological structure epitomized by permanently or temporarily waterlogged grasslands, bogs, swamps, papyrus, marsh, grassy fens and fertile floodplains (Kakuba & Kanyamurwa, 2021). It is argued that ‘wetlands play an irreplaceable role in regulating the global climate, maintaining the global hydrological cycle, protecting the ecosystem diversity and safeguarding human welfare’ (Xu et al., 2019, p. 1). The multiple benefits and services provided by wetlands are essential in achieving most, if not all, of the Sustainable Development Goals (SDGs) (Kakuba & Kanyamurwa, 2021; Ramsar Convention on Wetlands, 2018). In recognition of the numerous benefits and services wetlands provide to communities and their residents, they have been described as ‘kidneys of the landscape’ (Hassan et al., 2014), ‘jewels’ (Gardner et al., 2009) and as ‘prized land’ (Ramsar, 2018). Notwithstanding the benefits, the narrative of ‘wetlands under threat’ has dominated the global discourse on wetlands, over the last four decades (Dixon et al., 2021). Global losses of wetlands are at least 87 percent and 64 percent since 1700 and 1900 respectively (Davidson, 2014). The highest rate of loss are in locations and regions where development pressures are most intense (Wetlands International, 2015). In terms of location, the threat against wetlands is an ‘urban’ phenomenon than it is rural (Dar et al., 2020;

Isunju & Kemp, 2016; Kuusaana et al., 2021). Regionally, the threat is more devastating in the fast expanding cities of the Global South and particularly Africa, where unprecedented wetland depletion is leading to recurring environmental disasters (Campion, 2012; Hettiarachchi et al., 2015; Isunju & Kemp, 2016). In many African cities, there is evidence of massive transformation of urban wetlands – through drainage, landfilling, channeling of streams and construction of barriers and retaining walls – into land for property development (Andreasen, Agergaard, Kofi, et al., 2022; Asumadu et al., 2023; Isunju & Kemp, 2016; Munshifwa et al., 2021).

A review of extant literature reveals that encroachment of wetlands and other forms of urban greenery is a common characteristic of the urbanization processes in most cities in the global South and particularly African cities (Alabi, 2022; Azagew & Worku, 2020; Cobbinah & Darkwah, 2016; Isunju & Kemp, 2016). These studies suggest that a considerable number of the urban wetlands in African cities that are targeted for development are usually located in built-up areas with high property values (Andreasen, Agergaard, Kofi, et al., 2022; Asumadu et al., 2023; Kuusaana et al., 2021). The sale of urban wetlands by traditional authorities is influenced by economic calculation of releasing the latent value of marginal or idle land (Andreasen, Agergaard, Allotey, et al., 2022; Kidido & Biitir, 2022). Some scholars have indicated that, due to the magnitude and cost of engineering works required to convert wetlands into building lands, permits to develop wetlands are usually given to high-income groups and commercial high bidders (Kuusaana et al., 2021; Munshifwa et al., 2021). Having regard to these insights, we contend that the dynamics of urbanization, wetland encroachment and displacement in African cities is synonymous with the general characteristics of green gentrification in Western cities, which includes urban green spaces, increases in real estate prices, involvement of rich and powerful actors, the rent gap and displacement of vulnerable populations (Anguelovski et al., 2019; Rigolon & Collins, 2023). Interestingly, this relationship has eluded many of the scholars whose research borders on wetland encroachment and green gentrification. Therefore, the phenomena of wetlands encroachment (Andreasen, Agergaard, Kofi, et al., 2022; Isunju & Kemp, 2016; Kuusaana et al., 2021) and green gentrification (Anguelovski et al., 2019; Blok, 2020) are usually researched separately, with little or no linkage.

This article introduces the concept of wetland gentrification to broaden our understanding of the processes of urbanization, urban development, and displacement in African cities. Drawing on relevant and related literature, we unpack wetland gentrification and its implication for sustainable real estate development. Wetland gentrification occurs when customary authorities alienate wetlands – amid land scarcity and rising property values – in urban neighbourhoods to middle and high-income groups and large-scale real estate developers. Those who purchase urban wetlands engage in property development practices that displace, first, the ecological ecosystem, and subsequently, low-income households. The concept of wetland gentrification draws on and amplifies the theoretical framing of African urbanism, urban greenery encroachment and green gentrification. Even though a considerable amount of research has been conducted on these concepts separately, wetland gentrification holds promise to illuminate the intersection between them in the context of African cities. We conceive wetland gentrification and green gentrification as related but opposite concepts. While the latter has to do with increases in green amenities and its associated displacement of vulnerable human populations, the former focuses on the loss of

green infrastructure (specifically wetlands) and how development practices displace both vital ecological ecosystem and poor people. We frame wetland gentrification as tantamount to unsustainable property development because it relates to development of properties that, among others, deteriorates water quality and ecological lives, causes urban flooding, and deepens urban poverty.

The rest of the paper is organized as follows. Section two presents the methodology adopted in gathering and analyzing data for this study. The next section reviews literature on African urbanism and encroachment of urban greenery, gentrification debates and sustainable property development. Section four provides an analysis of wetland gentrification and its implication for sustainable property development in African cities. The last section concludes the article and provides relevant policy recommendations.

Methods

The analysis and insights in this article are based on a literature review and desktop research of relevant, related, and available data on African urbanism, urban greenery encroachment, green gentrification, and sustainable property development. The secondary data were gathered from two main sources: journals and policy documents. Key concepts such as African urbanization, urban green spaces, wetland encroachment, green gentrification and sustainable real estate development were used in carrying out search in online databases such as Google Scholar, Elsevier, Taylor and Francis Online, Springer and Sage. We relied on the references of the first set of literature to search for additional materials. In total, more than fifty published documents that report on the key concepts were reviewed for this study. Existing literature (Cobbinah & Darkwah, 2016; Cobbinah & Nyame, 2021; Dodman et al., 2017; Eshetu et al., 2021; Munshifwa et al., 2021) provided an important broader context on the nature of African urbanization and encroachment of urban green spaces across African cities. Specific insights into the status, causes and consequences of wetland encroachment were gleaned from the works of Asumadu et al. (2023), Kuusaana et al. (2021), Andreasen, Agergaard, Allotey, et al. (2022) and Isunju & Kemp (2016) among others. Research by Anguelovski et al. (2019), Blok (2020) and Rigolon & Collins (2023) were helpful in understanding the dynamics of green gentrification in Western contexts. The works of Abdulai & Awuah (2021), Berardi (2013) and Wilkinson et al. (2018) provide useful information on sustainable property development. These studies were complemented by policy documents such as Ramsar Convention on Wetlands (2018), Ministry of Lands and Forestry (1999) and Soz et al. (2016) among others.

Literature Review

African urbanism and encroachment of urban greenery

African urbanism is characterized by rapid population growth and uncontrolled spatial expansion. Studies suggest that African cities are the mostly rapidly growing cities in the world and there are projections that they will experience the highest rate of urban population growth globally in the forthcoming decades (Dodman et al., 2017). Notably, this population growth is occurring in an

expansive rather than a compact form, hence causing a fall in urban population densities and a high rate of land use change (Dodman et al., 2017). It is argued that African urbanism produces numerous adverse changes in human behaviour and urban landscape that affect urban greenery (Cobbinah & Darkwah, 2016; Cobbinah & Nyame, 2021). Significant land use changes in African cities are evident in encroachment and destruction of urban greenery by urban residents, through the increasing search for human habitation, the growth of business activities and the need to live within close proximity of employment hubs (Cobbinah & Darkwah, 2016; Dodman et al., 2017). There are different types of urban greenery in African cities, including semi-private green spaces in residential, commercial, and industrial areas; designated parks, street trees and roadside plantation; public green areas such as green parks, botanical gardens, and recreational centres; and wetlands within and close to urban areas among many others (Fuwape & Onyekwelu, 2011). While recent studies across many African cities point to the fact each of these types of urban greenery has experienced significant encroachment (Abass et al., 2019; Cobbinah & Nyame, 2021; Eshetu et al., 2021), the rate of depletion of urban wetlands outstrips all of them (Kuusaana et al., 2021).

Many African governments recognize the importance of wetlands as habitat for wildlife, for water purification and for the mitigation of flood conditions among many others (Ministry of Lands and Forestry, 1999). Hence, several countries in the continent have signed up for the Ramsar Convention, 1971 and further designated some wetlands within their territory for inclusion in the Ramsar list. It is estimated Africa has about 400 wetlands, which covers an area of approximately 1,341,500 km² and represents 3.98 percent of the continent's total land area (Li et al., 2022). 81 percent of Africa's wetlands are inland while the remaining 19 percent are along the coast (Li et al., 2022). While Africa does not have the highest number of wetlands, it is home to some of the largest wetlands in the world (Xu et al., 2019). Virtually every study on wetlands showcase staggering statistics about the continuous loss of wetlands in different parts of the African continent. Kakuba & Kanyamurwa (2021) indicates that the degradation of Kampala's Kinawataka wetlands has risen from 49 percent in 1992 to 95 percent in present times. Between the year 1984 to 2002, the Malagarasi-muyovozi wetlands has declined by 45 percent, from 36.35km² to 19.91km² (Materu et al., 2018). In Ethiopia, wetland areas in rice producing communities has reduced from 3114 hectares in 1973 to 1060 hectares in 2014 (Desta et al., 2022). Research by Adeleke (2022) shows significant loss of wetlands in six states in Nigeria from 1965 to 2019. He found, among others, that wetlands in Lagos state reduced from 708.96 hectares in 1965 to 7.10 hectares in 2005. In Mozambique, wetlands has reduced by 1.9 percent between 2001 and 2016 (Cianciullo et al., 2023).

Research has shown that wetland encroachment in African cities is caused by the combination of rapid urbanization, industrialization, and real estate development (Asumadu et al., 2023; Munshifwa et al., 2021; Xu et al., 2019). Rapid urbanization – characterized by high population growth and its attendant construction of new residential, commercial, and industrial development and expansion of existing public infrastructure – remains the major threat to wetland conservation in African cities. The main driver of the expansion of African cities is the unregulated acquisition and development of land for residential housing (Andreasen, Agergaard, Kofi, et al., 2022). Owing to the strong demand for housing close to the city for access to workplace and transport, suitable open spaces are developed quickly, leaving only wetlands and river floodplains (White et al., 2017).

The dynamics of consolidation and scarcity of land for development creates strong incentive for traditional landholders to alienate lands to wealthy individuals and big organizations (Andreasen, Agergaard, Kofi, et al., 2022; Asumadu et al., 2023). Kuusaana et al. (2021) for instance identified huge commercial land uses in Kumasi such as fuel retail stations, religious infrastructure, car retail garages and restaurants that have been sited on wetlands. Wetlands located close to roadside are particularly attractive to industries and commercial operators. As these private infrastructure spring up, the state is compelled to expand existing public infrastructure (such as roads, drains, bridges, and dams), sometimes into wetlands, to improve access to public service for surrounding communities.

Studies have noted some consequences of wetland encroachment in many African cities. The destruction of the different types of habitats located upstream of the Lake Kinkony wetlands in Madagascar resulted in sedimentation of lowlands and irreversible silting of water bodies (Weise et al., 2021). Isunju et al. (2016b) pointed out that increased pollution of the wetlands leads to rising water treatment cost and hence increase the cost of water supply to urban residents. They cited the example of the indiscriminate pollution of wetlands in Kampala, which has increased fourfold the monthly cost of water treatment by the National Water and Sewerage Corporation. The process of making products in industries located close to wetlands does not only make huge demands of the natural environment but also produces large quantities of unwanted waste, which often pollutes water sources (Munshifwa et al., 2021). Moreover, the construction of housing and commercial development on wetlands causes urban flooding. In an Accra study by Andreasen, Agergaard, Allotey, et al. (2022), they found that the growing number of housing developments close to and within wetlands in Adenta North, Santa Maria and Pokuase has led to urban flooding during heavy precipitation events and subsequently inundation of houses in these communities. These communities, and many others like them in other African cities, experience increased frequency of flooding because wetlands are not available to control surface run-off (Ministry of Lands and Forestry, 1999). In summary, the previous studies on encroachment of urban greenery have focused on the statistics, causes and consequences and have barely analyzed its relationship with gentrification.

Gentrification Debates

Gentrification has been on the research agenda of urban studies for more than 60 years. Consequently, the empirical research as well as theoretical debates on the complex relationships between urban development processes, neighbourhood change, rent gaps, and social conflicts have dominated much of the discourse on urban growth and inner-city development in Euro-American and Australian contexts (Lees et al., 2015). While the proponents argue that the capitalist logic of the rent gap theory and the aggressive speculation of capitalist agents in the urban real estate market is valid anywhere and, thus, everywhere (Smith, 2002), the critics have pointed out that there are considerable differences in the urban fabrics, urban land tenure systems and cultural attitudes towards land and the city (Maloutas, 2011, 2017). The critics have added that gentrification as a northern concept is not valid under the varied and dynamic circumstances of the global South (Ghertner, 2015). Since the postcolonial turn and debates on comparative urbanism gained momentum, more academic voices have asserted that theories like gentrification do not travel

across the globe and that a “theory from South” on urban development is particularly necessary in urban studies (Parnell & Robinson, 2012; Ren, 2015). They argue that at least an adaptation of the generic concept of gentrification to the “contextual realities in the South” is important (Lemanski, 2014, p. 2957).

For the European and North American gentrification researcher, the stakes are high and they would not back down on claims for generalization because the criticisms of the concept limits the global reach and relevance of their epistemological breakthrough (Lees et al., 2015, 2016). However, there is one central point that all voices in the lively debate do agree upon: there are simply not enough empirical and conceptual studies available on possible gentrification processes in the global South and specifically African cities. We lack empirical and conceptual insights into the varied and highly dynamic processes of urban growth and regeneration in the global South. And we miss Southern debates and dialogues across the hemispheres if we do not engage with a truly postcolonial approach in urban studies in the field of gentrification.

In this article, we attempt to fill an aspect of the knowledge gap. For this purpose, we choose a rather recent aspect of the northern gentrification debate: green gentrification. Green gentrification, also called environmental or ecological gentrification, is mostly researched in the global North (Blok, 2020; Rigolon & Collins, 2023). It implies the stirring up of gentrification processes through the creation of new parks and greenspaces. According to Anguelovski et al. (2018), the primary interest of scholars in this area is not only the processes by which low-income and minority populations are systematically denied access to urban life, but also the exclusion of the most economically vulnerable urban residents to the localized benefits of the ecosystem services. As the scholarship on green gentrification grows, recent studies have sought to extend the concept to interrogate urban development in southern cities. For instance, a Chinese study by Chen et al. (2021) confirmed that green gentrification phenomenon is not only present in Hangzhou but also suggest that large green spaces appear to foster gentrification due to their functional benefits, favourable policy support, elaborate embellishments, and strict management and maintenance regimes. Notably, green gentrification researchers admit that there is lack of studies on the concept in the urban global south (Anguelovski et al., 2019). This research introduces an African variant of green gentrification.

Sustainable property development

The property development sector is receiving growing attention global policies of sustainable development (Berardi, 2013). This is largely because the property development process impacts significantly on energy use, natural resource consumption, waste production, water consumption, biodiversity, climate change and the physical design of urban spaces (Wilkinson et al., 2015). For instance, it is argued that the property development sector as a whole consumes more energy than any other sector and is a growing contributor of greenhouse gas emissions (Wilkinson et al., 2018). The concept of sustainable property development has been introduced to reduce the impact of the human activity of property development on the environment (Razali et al., 2017). Over the years, there has been some definitions of sustainable property development. Wilkinson et al. (2015) notes that sustainable property development is the kind of development that embraces and balances social

aspects such as improving occupier health and wellbeing, environment aspects around using resources efficiently and in the interest of economies to ensure a viable and valuable property industry for future generations. Similarly, it connotes a healthy facility designed and built in a cradle-to-cradle resource efficient manner, using ecological principles, social equity and life-cycle quality value (Berardi, 2013). These definitions notwithstanding, there is a lack of an internationally accepted definition of sustainable property development.

Aside from the definitions, some studies have proposed a set of characteristics or principles to evaluate whether a property development could be considered as sustainable (Berardi, 2013; Wilkinson et al., 2015). According to Wilkinson et al. (2015), these characteristics comprise of land use, urban form and urban quality; environmental protection and enhancement; location and transport; resource use; and business and community characteristics. They argue, among others, that sites should be designed to meet the needs of end users with consideration given to how the buildings, infrastructure and open space will be used in practice while creating attractive spaces. Considering and preserving ecological values, including locally, nationally, and internationally important species and retaining or improving habitat values is increasingly recognized as an environmental concern. The construction and operation of buildings can produce pollutants that are detrimental to humans, flora and fauna and can sterilize land for long periods of time. As a result, sustainable property development should consider minimizing or avoiding polluting emissions during construction and operation. Access to a variety of modes of transport and local amenities are important in sustainable property development. There should be community engagement within the planning and construction process of sustainable property development. There should be conscious effort to prevent property development from being discriminatory on physical access grounds but should ensure access to accommodation and amenities by range of people to promote equality and diversity. Safety and security concerns should not be overlooked in sustainable property development.

Berardi (2013) also proposed that sustainable property development should (a) apply the general principles of sustainability (b) involve all interested parties through a collaborative approach (c) be completely integrated into the relevant local plans and infrastructure and connect into the existing services, networks and grids (d) have its environmental impact minimized (e) provide social and cultural value over time and for all people in a way that promotes a sense of place (f) be healthy, comfortable, safe and accessible for all among others. Empirical research across African countries indicates mixed implementation of the characteristics of sustainable property development. On one hand, a Nigerian study by Oladokun & Shiyambola (2021) assessed that the availability of sustainable features in 95 office buildings in Lagos. Findings revealed features for energy conservation (such as use of LED lighting, natural ventilation service and renewable energy), water conservation (such as water efficient fittings, low water consuming features and rainwater collection), health and wellbeing (use of sustainable materials, reduction of air pollution and tobacco and smoke control) and material use and construction (such as use of durable and recyclable materials) were available in the buildings. On the other hand, research by Abdulai & Awuah (2021) shows that the uptake of sustainable property development in Ghana has been extremely low. This is because only a few buildings in the health and commercial real estate sectors are currently classified by green buildings, based on three sustainability rating systems in the

country. They concluded that the property development sector is not contributing significantly towards the attainment of the sustainable development goals.

Analysis and Discussion

Wetland gentrification in African cities

As indicated in Figure 1, wetland gentrification in African cities is characterized by four specific features:

a. Urbanization, customary stewardship and rise in property values

Urban wetlands targeted for sale by customary authorities to developers for property development are typically located in urban neighborhoods with high land values. It is argued that a significant proportion – approximately 60 percent – of lands in Africa is held under customary form of ownership (Anafo et al., 2023; The Rights and Resources Initiative, 2015). In Ghana for instance, more than 70 percent of all lands is controlled by customary authorities (Ehwi & Asante, 2016). There is also evidence that more than 80 percent of Uganda’s land is held under customary tenure (Ntungwa, 2021). Consequently, the right to alienate customary lands rests with the bona fide customary authorities, but in accordance with appropriate statutory processes. The spatial pattern of global urbanization indicates that Africa is the new epicentre of urbanization and is expected to experience the highest rate of urban population growth globally in the coming decades (Dodman et al., 2017). As African cities expand into the urban fringes, customary authorities initiate the process of land conversion by requesting municipal authorities to prepare local plans and demarcate agricultural lands into building plots for the development of residential and commercial properties (Akaateba et al., 2021). Owing to the oversight of municipal authorities in the preparation of plans and demarcation of lands, wetlands tend to be preserved initially, as they are considered unsuitable for habitation. Likewise, developers show little or no interest in wetlands at this time due to the availability of suitable building plots. Over time, peri-urban neighborhoods become increasingly urbanized, as all lands are fully developed, leaving only wetlands. In some urban neighbourhoods, these wetlands occupy prime and strategic inner-city spaces close to major roads and intersections. Studies in Ghana, Ethiopia and Zambia have indicated that rapid urbanization coupled with burgeoning property values are significant driving forces leading to alienation of wetlands for property development (Asumadu et al., 2023; Hailu et al., 2020; Munshifwa et al., 2021).

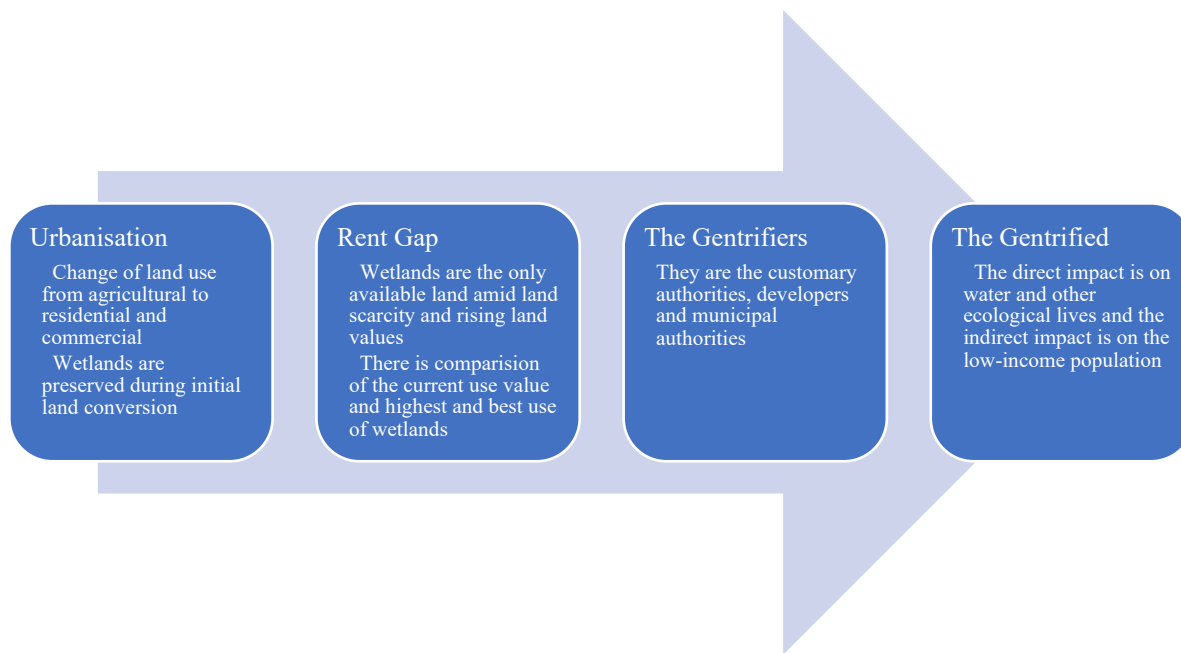


Figure 1: The process of wetland gentrification in African cities
Source: Authors' Construct (2023)

b. The rent gap question

As urban neighbourhoods become fully developed and real estate prices shore up, this changes the economic calculations associated with wetlands (Andreasen, Agergaard, Kofi, et al., 2022). The high land values of the urban neighbourhoods within which wetlands are located create a strong incentive for traditional authorities to commercialize wetlands. The edge to reap monetary gains from available lands is particularly stronger among traditional authorities – in capital and large cities – whose predecessors may have alienated all lands in their jurisdiction. For instance, a recent Kumasi study by Kidido & Biitir (2022) demonstrated that new chiefs, who took over from past chiefs or after a period of traditional power vacuum, gave instructions to all developers in their towns' peripheries to submit documents to the palace for inspection. They added that the outcome of obeying such orders is that new documents were issued, and money charged. The study emphasized that this outcome has become a common practice in the Ghanaian land market whenever a new chief assumes the reign of power (Kidido & Biitir, 2022). More to the point, across many African countries, there is growing abuse of fiduciary powers vested in customary authorities, leading to wanton sale of lands held in trust for the members of the landowning group (Anafo, 2015; Schoneveld, 2017). Often time, such alienation takes place with engagement with community members or residents (Schoneveld, 2017). Similar practice is at play when customary authorities seek to extract monetary gains by offering urban wetlands for sale to developers. The sale of urban wetlands by customary authorities is underpinned by the assumption that the current use or ecological value of a 'marginal' wetland is significantly lesser than the value that will accrue when the wetland is put to its highest and best use of property development. Put differently, 'people are looking at the economic worth of wetlands and not the environmental importance' (Adetayo, 2022). To attract prospective buyers, chiefs would sometimes offer urban wetlands at relatively lower price than the open market value (Asumadu et al., 2023). From the perspective of developers,

acquiring urban wetlands for development is an opportunity to gain access to affordable land in desired locations (Andreasen, Agergaard, Kofi, et al., 2022).

c. The Gentrifiers

Wetland gentrification is perpetrated by an alliance of wealthy and powerful urban actors. They are customary authorities who alienate wetlands, developers who build on wetlands and municipal authorities who grant building permits. Previous studies have overly focused on the wetland encroachment by slum development and livelihood activities of the poor and marginalized urban populations (Abu & Codjoe, 2018; Ajibade & McBean, 2014; Amoako & Inkoom, 2018; Jordhus-Lier et al., 2019). According to Andreasen, Agergaard, Allotey, et al. (2022), the preoccupation with the encroachment of the poor obscures the link between wetlands and the wider urban development practices in African cities. They contend that the development activities of middle and high-income groups also encroach on wetlands and other ecologically sensitive spaces in cities. It is these groups who have the financial strength to fund the cost of landfilling required to bring a wetland to the state suitable for real estate development. For instance, Andreasen, Agergaard, Allotey, et al. (2022) indicated that their three case studies sites – Adenta North, Santa Maria, and Pokuase – in Accra where wetland encroachment is rife, is mostly inhabited by middle and high-income homebuilders. In the case of Pokuase they found that ‘the low-lying wetlands on the western side of the Accra-Nsawam highway have attracted individual builders ... who have filled up the wetlands with stones and sand and built bungalows of varying sizes’. The power wielded by these homebuilders is so immense that they can maneuver statutory processes to secure permits to develop real estate on wetlands and can prevent municipal authorities from demolishing such properties (Kuusaana et al., 2021). Municipal authorities, perhaps, may be enticed by encroachers to compromise on wetland encroachment due to the possibility of collecting the property rates from these developers to improve internally generated funds (Adetayo, 2022; Asumadu et al., 2023).

d. The Gentrified: Displacement beyond human population

The main characteristic that distinguishes wetland gentrification from all other forms of gentrification is that the development activities of the gentrifiers has displacement consequences for both the ecological ecosystem in wetlands and human population. The first and direct displacement affects the different non-living (water and soil) and living (plant and animal) elements of wetlands. Real estate development dries up or diverts the course of water in wetlands, jeopardizing efforts of African countries towards the protection of water-related ecosystems to ensure they continue to provide social and economic services and benefits to society (United Nations, 2018). It, simultaneously, eliminates the different soil layers and landforms that play a role in preserving the water within wetlands. The absence of the water and soils leads to the death of the plants as they lack the ecological support systems to grow. The presence of water and the wide array of plants in wetlands makes them a suitable habitat for different varieties of animals. Property development leads to the destruction of the habitat of the animals in wetlands, causing the death of some and relocation of others. The second and indirect displacement affects human populations through urban flooding. One of the key functions of wetlands is its effectiveness for flood abatement. Property development undermines this function of wetlands and aggravates flooding in many parts of the African cities. Although urban flooding may affect both rich and poor

neighbourhoods, ‘poor city neighbourhoods are more prone to flooding and other natural disasters than wealthy neighbourhoods’ (Campion, 2012, p. 35). Numerous scholarly research have demonstrated that urban flooding has led to the displacement of many poor and vulnerable households and communities (Amoako & Inkoom, 2018; Isunju et al., 2016b; Korah & Cobbinah, 2016). However, there is also evidence that the middle- and high-income groups suffer urban flooding (Andreasen, Agergaard, Allotey, et al., 2022).

Implication of wetland gentrification for sustainable property development

The quest for sustainable property development has become critical in this era of growing urbanization and a changing climate, with their accompanying socio-economic and human health challenges (Cobbinah & Nyame, 2021). This is because sustainable property development promotes the preservation of urban greenery, makes room for the participation of all interested parties in development projects, improves water quality and availability, and enhances flood control (Berardi, 2013; Wilkinson et al., 2015). In this section, we demonstrate that wetland gentrification defeats these important characteristics of sustainable property development. In simple terms, we conceptualize wetland gentrification as synonymous with *unsustainable* property development.

To begin with, municipal authorities across Africa are empowered by legislations and policies to protect wetlands and refuse permits for property development, in accordance with sustainable urban development. For instance, according to the Accra Metropolitan Assembly (Environmental Protection) Byelaws, 2017, the assembly shall in conjunction with the Lands Commission refuse to grant permit for development or a lease in respect of a Ramsar site or ecologically sensitive area to a prospective developer. Likewise, in August 2015, Uganda’s Ministry of Water and Environment launched a wetland atlas for Kampala and neighbouring districts of Mukono and Wakiso in a bid to raise awareness about the importance of wetlands, following a cabinet directive to cancel all illegal land titles in wetlands and evict encroachers (Isunju et al., 2016a). This notwithstanding, the incidence of wetland gentrification signifies that some property development in African cities is taking place in urban wetlands. The emergence of these properties raises questions about urban land governance in terms of the legislative regulatory frameworks and the capacity of the institutions in place for protecting and managing urban wetlands (Cobbinah & Nyame, 2021). More importantly, these property developments deplete urban greenery and compromise their ecological benefits. Such properties are very costly to develop, as extreme weather conditions can cause delays or damages which can result in cost overruns. Properties developed in wetlands also risk structural failures since the soils and other conditions may not be suitable to hold the structural loads (Asumadu et al., 2023).

Secondly, sustainable property development strongly supports the participation of interested parties (Berardi, 2013). Such engagement is crucial to ensure that property development is implemented in a manner that meets the needs and aspirations of communities while minimizing the negative impact on the environment and promoting social and economic wellbeing. Nevertheless, we have learnt from the concept of wetland gentrification that decisions of whether to alienate land and grant permit for property development is typically monopolized by customary authorities, while

making little or no room for community participation. Recent studies have shown that the customary land governance systems in the urban settings of African cities have collapsed in favour of commoditized systems due to the growing demand of land for residential, commercial and industrial purposes (Yaro, 2010). This is further compounded by the absence of rigorous checks and balances in the customary fiduciaries, resulting in the exploitative and iniquitous conduct in the land alienation processes (Anafo et al., 2023; Schoneveld, 2017). The development of urban wetlands often comes as surprise to urban resident, due to the absence of citizen participation.

Thirdly, an important consideration in sustainable property development is the need to minimize the environmental impact of development activities on water and ecological resources. This is particularly crucial in Africa, where access to water resources is not yet universal, with 1 in 3 people facing water scarcity and about 400 million people lacking access to basic drinking water (Holtz & Golubski, 2021). There are expectations that the property development sector can help mitigate the water crisis by using non-potable water for construction activities, installing rainwater harvesting systems and using water efficient systems and fixtures among others. Nevertheless, through the processes of wetland gentrification, property development in ecologically sensitive areas is having adverse impact on water quality and availability and is likely to worsen the water crisis for residents of African cities. For instance, studies in Congo and Ghana have shown that one of the most critical harmful effect of developing property in wetlands is deterioration in water quality (Asumadu et al., 2023; Mbala et al., 2019). This is because property development results in increased sedimentation, which is the largest causes of water pollution (Houser & Pruess, 2009). In the absence of wetlands, water quality will suffer, as there is no natural resource to reduce the organic and inorganic pollutants through different physical, chemical, and biological processes; neither will there be a sponge to reduce erosion and prevent sediments from being transported downstream. Not only does property development in wetlands affect water quality, it has a negative impact on water supply for essential household activities such as cooking, bathing, and washing (Xu et al., 2019). Apart from water quality and supply, property development in wetlands has resulted in marked decrease or extinction in the population of plant and animal species. Specifically, development activities such as excavation and landfilling which are essential in stabilizing wetlands to ensure structural integrity of buildings tend to disturb, endanger and bring about the extinction of aquatic and terrestrial lives that depend on wetlands for survival (Asumadu et al., 2023). Studies have demonstrated that 21 percent of the freshwater species – including fish, crabs, dragonflies and selected families of aquatic plants – in continental Africa are threatened with extinction, putting the livelihoods of millions of people at risk (International Union for Conservation of Nature and Natural Resources, 2010).

To cap it all, sustainable property development makes provision for adequate urban greenery that can absorb water and reduce or eliminate the incidence of flooding. Property development in wetlands, on the other hand, causes urban flooding and subsequent displacement of human population from their communities. One of the major causes of urban flooding in African cities is the rapid expansion of settlements and public infrastructure into ecologically sensitive areas. The consequence of this expansion is the hardening of catchment areas by buildings, roads, and other impermeable surfaces, preventing water from infiltrating into the soil and causing it to run off into drainage systems and waterways, thereby increasing the chance of flooding (Lucas, 2020).

Essentially, property development in wetlands results in the loss of flood control capability performed by wetlands (Mbala et al., 2019; Xu et al., 2019). When flooding occurs, it is typically the poor households who suffer the impact in terms of loss of income, belongings, and displacement. Sadly, only a few of the affected poor people can afford the cost of relocation. For instance, a Kumasi study revealed that, despite suffering annual flooding, over 60 percent of the respondents indicated they could not afford the cost of moving to another accommodation; 10 percent stayed on proximity to workplace or had businesses located in the flood risk area; and 19 percent remained because they have either lived in the area all their lives or because it was a family home (Jha et al., 2012; Lucas, 2020). More so, property owners experience a drop or loss of rental income, as prospective tenants stay away from flood prone areas (Attakora-Amaniampong et al., 2016). Yet, they may incur high cost of maintenance, as property development in wetlands can lead to long-term battles with water surges and continuous flooding (Asumadu et al., 2023). The valuables of people are also destroyed during flooding. The loss of income, high cost of property maintenance, and displacement, caused by flooding, has the potential to deepen urban poverty and widen urban inequality.

Concluding remarks

The primary objective of this article was to analyze the concept of wetland gentrification in African cities and its implication for sustainable property development. This article has demonstrated that the novel concept of wetland gentrification draws on and sits at the confluence of extant literature on African urbanism, wetland encroachment and green gentrification. It shows that there are marked differences between the dynamics of urbanization, property development and urban displacement in Western and African cities. As opposed to green gentrification in Western cities, whereby environmental improvements drive up real estate prices and subsequent displacement of low-income residents, this article demonstrates that wetland gentrification occurs when land scarcity and rising property values in cities cause indiscriminate depletion of urban wetlands, leading to the displacement of ecological resources and human populations. Our findings point to the limitation of the northern conception of green gentrification and its less applicability in some southern contexts. Broadly, this article has contributed to the discourse on advancing a collective environmental consciousness among property development stakeholders and their responsibility towards the protection of essential urban wetlands (Asumadu et al., 2023; Cobbinah & Nyame, 2021). Specifically, the findings of this study provide customary authorities, municipal authorities, and private developers across Africa and the global south with the necessary insights about the risks and consequences associated with the alienation, approval, and development of wetlands.

We have argued that wetland gentrification is characterized by four distinct but interrelated features. One, the urbanization processes and customary stewardship in African cities renders wetlands potential target for alienation. Two, the eventual sale of wetlands by customary authorities and subsequent permit approval by municipal authorities is driven by the rent gap assumption that the current ecological value of wetlands is significantly less than the potential highest and best value of converting for residential and commercial purposes. Three, the actors of wetland gentrification are wealthy and influential people who can navigate alienation, municipal approval, and demolition. Four, it causes the displacement of wetland elements (water, soil, flora, and fauna)

and subsequently human population through urban flooding. We have also demonstrated that the incidence of wetland gentrification in African cities signifies that a considerable number of landed properties are not developed in a sustainable manner. This article has highlighted four implications of wetland gentrification for sustainable property development. First, it does not only deplete urban greenery, involves high cost of development, risks structural failures but also raises questions about the law enforcement and the capacity of institutions charged with the responsibility of protecting wetlands. Second, it has the tendency to collapse the customary land governance systems, where urban residents and communities would not have a voice in the alienation of wetlands. Third, it has negative impact on water quality and supply as well as well as extinction of vital plant and animal population in wetlands. Lastly, the hardening of wetlands through property development causes urban flooding, which leads to loss of income and belongings, high cost of property maintenance and displacement of low-income populations. Based on these implications, we conceive wetland gentrification as one of the ‘wicked problems’ in African society, which requires urgent policy attention.

This article provides some policy recommendations for consideration. Firstly, although the International Finance Corporation and other green-oriented institutions are vigorously educating built environment professionals and real estate development organizations about the relevance of designing and developing properties to reduce energy, water, and material consumption, there is the need for extensive public education about the significance of wetlands to human existence (Asumadu et al., 2023). This should be complemented with strict enforcement of land and environmental laws to protect wetlands in strategic urban locations. As done in Uganda, municipal authorities could create an atlas of wetlands and declare them as unqualified for permit approval (Isunju et al., 2016a). The declaration could be in the form of a legible notice placed at the site of the wetland. This would deter customary authorities from alienating wetlands and private developers from acquiring it for property development. However, where property development in a wetland is being given consideration, there should be deep consultation between customary authorities, the developer, civil society, and municipal authorities. There should be assurance that adequate measures have been taken to minimize future environmental impact. Otherwise, citizen groups and civil society should contest, through protest and litigation, the development of properties on wetlands (Schoneveld, 2017).

Secondly, this article has indicated that land scarcity coupled with the high demand for property development drives wetland encroachment. As a solution to the land scarcity conundrum, it has been suggested by Asumadu et al. (2023) that African countries should emulate Asian countries such as Singapore by resorting to the development of vertical cities (Wong, 2004). Nevertheless, Agyemang et al. (2018) have cautioned African countries against the embracing high-rise buildings as sustainable property development pathway. They argue that Ghana and African countries more broadly should pursue high-rise development with circumspection, as there is low social acceptability of high-rise developments and a weak institutional capacity for efficient service delivery. We agree with Agyemang et al. (2018) that the design and promotion of high-rise developments should be tailored to meet the needs of the people for whom they are built and recognize the importance of effective service delivery. The development of vertical cities will

require individuals and developers to come together through housing cooperatives to develop properties.

Lastly, this study shows that urban wetlands in African cities are depleting at a very fast pace. In replenishing the loss of the natural wetlands, it is recommended that African countries invest in man-made or constructed wetlands. Constructed wetlands duplicates the processes occurring in natural wetlands by providing the system in which water, soil, plants, animals, microorganisms, and the environment interact to create a wildlife habitat, improve water quality, and control flooding. Studies have shown that constructed wetlands are less costly to build and maintain and as such suitable for developing countries with plentiful lands and limited funds (Griffith, 1992). As this study is based on a review of literature, we suggest that further research should focus on providing empirical insights in different African cities to enrich and expand the discourse of wetland gentrification.

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Affordable housing programmes in developing countries: The situation of low-income earners and owning houses in Burundi, Ethiopia, and South Africa

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Abstract

This paper aims to answer why affordable housing programmes implemented to assist low-income earners in selected countries (Burundi, Ethiopia, and South Africa) have not benefited low-income earners from owning housing in these programmes. The paper used a mixed research approach in data collection and analysis. The desk review, questionnaire, key informant interview (KII), and observation were used to collect primary and secondary data. Content and descriptive statistics were applied to analyse data. The findings show apart from South Africa where low-income earners can afford a house in affordable housing programmes, Burundi and Ethiopia programmes have served civil servants who are not low-income earners. Generally, Civil servants belong to medium- and high-income earners and can finance their housing using private financing. Public programmes for affordable housing have been benefiting those who were not in urgent need of housing. This has left low-income earners to live in horrible and miserable houses. The paper recommends that developing countries should well-define and determine who is low-income and prioritize low-income earners in public affordable housing programmes.

Keywords: Affordable housing, Burundi; Developing countries; Housing; Low-income

Introduction

Providing affordable housing to low-income earners has been an agenda and objective of all governments all over the world (Wetzstein, 2017; Moore, 2019). The terminology ‘Housing’ has been used by some to mean having a unit of wall and roof under which people live whereas others see it as shelter and infrastructure around it (Moore, 2019). Safety, dignity, and privacy are important for any housing unit (AHA, 2022). Whatever the understanding, the problem remains to define and conceptualise ‘housing affordability’ to mean affordable ‘housing’ as a shelter for everyone. The affordability also is viewed in terms of rent and ownership by individuals. Wilson and Barton (2022) make it clear that housing costs, income levels, and other factors determine rent affordability and housing ownership. The other factors are encapsulated in residual income expression that allows households to meet the necessities such as food and clothes after paying their rent or mortgage. According to Padley et al. (2019), it is said that housing rent or mortgage is affordable if a household can afford to pay for its rent/mortgage and is capable of supplying the family with basic needs.

Moreover, OECD (2021) mentions that housing affordability should be viewed in trio-aspects of housing, price-to-income, and housing expenditure-to-income ratio measures. Then, Padley et al. (2019,p.13) put it in simplistic expression that ‘If families can afford to pay for their children's shelter, food, clothes, and school fees, it is assumed that there is a minimum income standard and that the housing is affordable’. The same, affordable housing can be understood by considering the housing price-to-income and expenditure-to-income; residual income, and housing quality (OECD,

2021). Additionally, Moyo (2004); and OECD (2019) disclose that housing affordability is achieved if households spend less than 40% of their income, and beyond that, it becomes a burden to households. However, this has to be checked for developing countries where prices of basic needs are unregulated. The issue of market forces, politics, and economic imbalances have implications for housing affordability (Ansell and Cansunar, 2021). Hegedüs et al. (2015) opined that strategies of households to afford houses have a triple imbalance such as housing demand, housing stock and costs, and policies in place. Likewise, Ofori (2020) explains that in countries where the demand is high and the supply is low, it has implications for housing costs to be unaffordable while policies are seen as ineffective in handling the issue.

However, the high demand for housing in developing countries has been a result of population growth and rapid urbanisation that is difficult to address immediately (UN-Habitat, 2011; Schlimmer, 2022). Both rural and urban areas are observing a population boom despite many efforts engaged by governments to control this increase (UNDESA, 2021). The rural-to-urban migration practiced by young and poor people to search for a better life has engendered rapid urbanisation (Tacoli, et al., 2015). All these have led to high and competitive demand for housing in countries with less supply, and ineffective housing and housing-related policies. Most public service servants find themselves incapable of supplying their families with basic needs when considering their residual income and opt to resist paying the housing rent (Adeleke, 2021; Adeleke & Olaleye, 2020).

However, there are countries such as Algeria, Egypt, Senegal, Morocco, South Africa, Mauritius, Eswatini... in developing countries that have been cited to offer the best practices in designing housing programmes that delivered affordable housing for low income. These countries are mostly located in North Africa except South Africa and Senegal (Center for Affordable Housing Finance in Africa, 2022). These countries are also highly urbanised with a low level of informal settlement due to affordable housing programmes that were designed to cater to the housing demand for their citizens. In other developing countries, it is acknowledged that similar programmes have been designed, but still, low-income earners are facing serious housing problems such as homeless, living in crowded housing units, low-quality houses, far away from their working places, and most people living informal settlement as well as in hazardous lands (Tadashi & Jonathan, 2015; Mohammed, 2017; UN-Habitat, 2011).

Therefore, this study aims to answer the question of why affordable housing programmes implemented to assist low-income earners in selected countries (Burundi, Ethiopia, and South Africa) have not been beneficial to them and propose what can be done in countries where low-income earners are not served by these programmes. The study documents the causes of low-income earners finding themselves in poor housing and homelessness despite the existence of affordable housing programmes. The study has the purpose of using the findings in proposing alternatives that affordable housing programmes can benefit low-income earners in cases countries and other countries of the same context.

Understanding the housing problem in Africa

Many African countries are facing the challenges of inadequate and poor housing (Moore, 2019). According to UNCHS (1998), the inadequacy is expressed in terms of minimum privacy, occupancy ratio, physical accessibility, security of dwellers, durability, lighting, heating, ventilation, and basic social infrastructural services. with 50% of the population that lives in urban areas, it is estimated that 75% of Africans in urban areas live in informal housing with some inadequacies (Fekade, 2000; Kironde, 2016; Udessa et al., 2023). Furthermore, deficits in housing production for many African countries are alarming which goes even to a million house units per year (Addae-dapaah, 2021). Affordability in terms of income is also a problem in countries where their citizen cannot afford to pay the cost of the cheapest newly built house.

Table 1: Summary of some countries in Africa with cost the cheapest newly built house and percent of urban households who can afford this house.

Countries	Cost of the cheapest newly built house in an urban area: Currency in US\$	Per cent of urban households who can afford the cheapest newly built house, at US\$ 8040 house (2021)	GDP/per capita: Estimated in US\$
Liberia	39 998	0.15	673
Mozambique	9 706	2.81	500
Madagascar	22074	4.44	515
Zambia	34 690	4.74	1 123
Burundi	26 717	10.46	237
Tanzania	49 512	31.85	1 136
Ethiopia	17 319	25.00	945
Somalia	37 936	100	446
Algeria	48394	99.68	3765
Egypt	23933	99.82	3 876
South Africa	41373	67.11	6 994

Source: Adapted from (CAHF, 2022)

The GDP per capita for some countries explains the capacity of people to afford to buy the cheapest newly built house in their countries. However, the GDP per capita is not the sole determinant of affordability to buy new cheap houses. Given that there are countries like Somalia that have low GDP per capita but with 100% of urban dwellers to afford to buy the cheapest newly built house. It is acknowledged that housing policies and other land-related policies affect significantly housing affordability, both renting and owning (Komu and Ramparsad, 2022). Also, Bakhtyar *et al.* (2013), Bredenoord (2016), and Adesanya et al.,(2017) disclosed the importance of regulating building materials availability and prices to address housing affordability. From Table (1), we can conclude that all these parameters contributed to the differences observed in GDP per capita, housing affordability percentage for urban dwellers and the cost of the cheapest newly constructed house in corresponding countries. It is indicated that some African countries may have less than 1% that can afford the cheapest newly built houses. However, it does not mean that there are no new houses produced.

Except for informal settlements which may have informal dwellings⁵, some houses are slums and are not suitable for human beings to live in (UN-Habitat, 2011b). With the use of local materials that are cheap and non-durable, and affordable at low cost or for free (Bakhtyar *et al.*, 2013), people become owners of houses that are of poor quality according to meaning by Rust (2022). Furthermore, the use of second-hand building materials and constructed with traditional and outdated technologies (Plate 5&6 and Plate 7&8) are some houses you may find in some informal and formal neighbourhoods for low-income earners (Bredenoord, 2016; Adesanya, Kolawole and Olugboyega, 2017). The existence of such types of houses may convey the message that there are no affordable housing programmes that are designed to assist these people. The other message may be that supply is below the demand.

Other problems relate to overcrowding with more than two people of the same gender in one room, having children over 12 years of different sex living in one room (Amoako and Boamah, 2017; Moore, 2019; OECD, 2019). The problem of the housing extends to having people who are homeless and others living in accommodations that are in unsafe conditions (Vuyokazi, 2010). We notice that the housing problem in Africa is not only about affordability, but the quality is another issue. The issue of lacking decent accommodation is at its peak summit and needs to be addressed in an urban and rural areas.

Ofori (2020) highlighted that due to urbanisation and population growth, governments in developing countries find themselves in difficulties meeting the demand for housing. Moyo (2004) and Huchzermeyer (2001) showed that governments, development partners, NGOs, and other private companies have conjugated their efforts to assist low-income earners in affording decent accommodation. However, the authors cited those challenges related to interpreting housing affordability in monetary terms, perceiving affordability through the socio-political lens, the commodification of housing, and ignoring people-centred housing projects that affected low-income earners from accessing affordable housing.

Root Causes of housing shortage in Africa

Combating the housing shortage starts with making land available to all layers of the population in the country. Unregulated land access, tenure security, land transfer, and land rights all are problems that hamper poor people from affording housing (Nagya & Udoekanem, 2022; UN-Habitat, 2021).

Moreover, the socio-political problem even though has not been echoed among other problems by many researchers, is among the problems that make some developing countries be in shortage of affordable housing. Political issues include instability and lack of continuum housing programmes, favouritism coupled with corruption make housing programmes monopolised by one political movement. Social issues include inequalities related to wealth, segregation linked to ethics, and regional and race groups among citizens that have been neglected and this affects housing affordability (Ansell and Cansunar, 2021). Given that it is rare to find a country in Sub-Saharan African countries that do not have a history of segregation either based on race (colour), ethnic group, or region, it is worthy of mentioning it as another cause of housing shortage. The research

⁵ A house with one of the materials used in its construction is not finished and Households without access to flush sanitation have no waterborne sewage disposal. (Rust, 2022 cited in)

(Vuyokazi, 2010) shows that Blacks in South Africa are placed still in Ghettos that are outside the cities and towns where no jobs or other economic opportunities. Many stories on South Africa have accounted for the apartheid regime abolished in 1994 but with sequels observed on low-income earners to afford to house.

For Ethiopia, the segregation is observed in state hegemony where from 1991 when the Ethiopian People's Revolutionary Democratic Front (EPRDF) instituted regional administrations that resulted in dividing Ethiopia into states and segregating Ethiopians among ethnic groups based on the states. This division was accompanied by allocating and improving housing conditions and other related infrastructure for some regions while at the same time leaving behind other regions lagging (Lie and Mesfin, 2018). There was political and economic empowerment to the junta and the allies which benefited from the federal budget to the detriment of others (Young, 2004). One of the problems that are echoed at regional and international discussions as an internal factor according to Aregawi (2001) is 'an elite, which is fragmented on – ethnic divides. The author does not ignore 'The leadership, which in most cases is authoritarian, lacks accountability and transparency and is entrenched in corruption.

In Burundi, ethnicity and regionalism have been practised since 1972 when the massacre of Hutu was planned and implemented by a group of Tutsi to kill all educated businessmen (Greenland, 1976). The subsequent years were marked by denying education and other opportunities to Hutu and Twa so that they could not afford housing in all forms. It is said that there was even an agenda to sweep out hutus in urban areas and form a kind of apartheid based on ethnic groups. That is why you find some Neighbourhoods that are dominated by one ethnic group (Tutsi). The housing projects were also located in such Neighbourhoods.

Low-income earners in developing countries and affordable housing

Low income is measured by using the low-income cut-off line as it is for measuring poverty where the poverty- line is used (Adeleke, 2021). Poverty and low income are terms that explain each other but do not have the same meaning. This means that being a low-income earner does not mean that you are a poor person. The relative approach and ignoring the absolute approach to define low income, are concerned with defining incomes as low by considering the incomes of the population as a whole where a low-income line is set at a certain percentile of the income distribution (Forster, 1994). What we can underscore here, is that every country has its way of determining low-income line in considering the specific basic needs. Most developing countries (23/54 in Africa) are known as low-income economies (Yeboua & Jobarteh, 2023). Whereas the meaning and characteristics of low income may differ in developed to developing countries, In the African context, the low-income earner extends hyperbolically to those who cannot afford basic needs such as food, clothes, and shelter. If afforded, they may be of critical quality which this study is coined to reveal for the housing aspect of it.

Housing finance and low-income earners

The problem related to housing, the shortage of housing, and the non-affordability of housing by low-income earners are related to the financial problem. For developing countries, housing finance has been discussed for two decades and it is persisting (Datta and Jones, 2002). The strategies for

housing finance that include public housing finance and self-finance have shown together a failure to address housing issues that include overpopulation, homelessness; and low quality house acquisition (slums and informal building) (UN-Habitat, 2008). The area of failure first of all on land access (Arjjumend & Seid, 2018); policies that are not implemented despite their adoption (Hudson, et al., 2019; Turimubumwe, Adam and Alemie, 2022); and poor land governance (García-Morán et al., 2021); governments that prioritise other projects rather than housing for the poor (Bakhtyar *et al.*, 2013); and low-income earnings that lead to low savings (Bakhtyar et al., 2013). Whereas self-finance is the only way that easily makes households access land and build their own houses, financial institutions are known as facilitators to support these people through home loans (UN-Habitat, 2008). However, some countries like Liberia, Zambia, and Mozambique do not have these financial institutions, and where they exist, do not use them due to unregulated interest rates for loans for housing.

Research Material and Methods

This paper aims to answer the question of why low-income earners have not benefited from affordable housing programmes implemented in developing countries in Africa like Burundi, Ethiopia, and Tanzania. The paper applies a mixed research approach to collect qualitative and quantitative data. Qualitative data collection methods through desk review and key informant interviews were applied to the case of South Africa and Ethiopia. The paper also applied questionnaires, Key Informant interviews, and interviews for the case of Burundi. For all cases, the observation was applied to confirm and support some findings in desk review, KII, and interview.

The desk review concerned the collection of secondary data that are in published articles, books, reports of different financial and housing institutions, and legal texts such as policies, proclamations, and regulations. The desk review is one of the methods useful in collecting data remotely and others that relate to the past performance of institutions (Dawadi et al., 2021; Walliman, 2011). The desk review results were also useful to set the scene of the paper conceptualise, and locate it within the existing knowledge.

The interview and KII were used to collect data from individuals and influential persons within the community (Burundi). The interview was applied because it gives chance to researcher to ask any questions that are judged to respond to the research question (Macdonald and Headlam, 2008). The interview participants were selected by using a purposive sampling technique where 98 respondents from different occupations participated in the study. Key informant interview, Six participants were contacted; three in Cape Town, and three in Bahir Dar.

The questionnaire was also applied in Burundi and participants were selected using systematic random sampling. The selection of the case study area was purposive sampling. Therefore, Gahahe and Ngagara IX in Bujumbura were selected given that one is a place where social housing was implemented in the past years ago, and Gahahe is the new neighbourhood where the majority of people are homeowners. The participants were selected by applying the 5th and 12th house intervals respectively. Then, 50 households in Ngagara IX and 80 in Gahahe shared their data in this study. This helped the researcher to understand how low-income earners were not considered in projects implemented in Burundi for affordable housing. The questionnaire results also assisted the researcher in knowing why low-income earners cannot afford to own a house or pay for rent.

Finally, a mixed data analysis technique is used in this paper. Merriam (1998) and Bernard (2000) acknowledge that qualitative and quantitative data are analysed differently with different techniques in the mixed data analysis method. Therefore, qualitative data are analysed by using a content analysis approach. Bryman (2012, p. 289) defined content analysis as ‘an approach to the analysis of documents and texts that seeks to quantify content in terms of predetermined categories and a systematic as well as replicable manner. The process involves data interpretation, comparison, and contrast to prove their validity and accuracy in responding to the research objective. For quantitative data, a descriptive approach is engaged where statistics using percentages and graphs are used to present the numerical information. LeCompte and Schensul (1999) underline that the descriptive data analysis technique tries to help data make sense, interpret, and generate findings from data and facts that have been collected. The information is presented in text and table format to assure readability and presentability.

Findings and discussion

In Africa, housing programmes have been designed and implemented by governments and development partners under the umbrella of providing affordable housing to low and middle-income. Some countries have even embellished the projects as low-cost housing to emphasize and even maybe call on attention to funders. However, the naming of projects as low cost or affordable has remained in papers given that the number of homeless and crowding in one room, informal homes, and informal settlements are observed in almost all countries.

South Africa

In South Africa, the quality of housing reflects income earnings and social belonging⁶. The programmes for housing also differ from province to province, town to town, and city to suburb. The prices also depend on location within the city or town. South Africa is among the African countries that are ranked among successful countries in providing affordable housing to low-income earners the reports show that 83% 2021 of South Africans live in formal dwellings, 15% live in informal settlements, and 4.3% are found in traditional homes in rural villages. The statistics again show that 69.7% of households own homes, 7.7 % are still paying off their mortgages whereas 18.7% are renters and others live free of charge (CAHF, 2022). Even though the statistics give hope, the observations in some cities like Johannesburg and Cape Town show that there are still people who live in decayed houses made of iron sheets on willing and roofing around multistorey buildings and villas (Plates 1&2). Also, there is a mushrooming of informal settlements along wetlands, arterial and collector roads as well as in open spaces especially in Cape Town. The interview with local leaders and social movements reveals that every South African has the right to acquire property and even those we see in the informal settlements are encroachers who before had their own houses and have rented them to newcomers (migrants). The KII informants’ results revealed that the source of the informal settlement is related to political, economic, and social freedom that is respected in South Africa. They mention one of the freedoms as prescribed in the Constitution Article 19 on a residence, Article 26 on economic activity, and 28 on property. People

⁶ For example, in Cape Town, good houses are located along the sea or in rural areas without public transport which allows only high income to live there

encroach on open space and term it as 'home'. To evict them, there must be a court decision. They use their rights in the wrong way when it comes to property rights given that the consequences have resulted in informal settlements in cities. The encroachment of public lands like wetlands, open spaces, and hazardous land affects the built urban environment as well as the image of the city.

Plate 1: Informal dwelling in informal settlements

Plate 2: Informal dwelling around a multistorey



Source: Author's photograph, March 2023

Affordable Housing for low-income earners in South Africa

With the support of the government of South Africa in subsidizing housing supply for all native citizens, South Africa offers the opportunity to low-income earners to finance their housing through channels and schemes offered by the government. With its largest economic growth in Africa with an estimation of a GDP of US\$418 billion) and a population of 60 million (US\$6966/capita), The low-income earner in South Africa can be assisted by the government with affordable housing through government schemes. There are social housing institutions that advocate and manage housing projects for low-income earners. Those are citizens who earn a monthly gross income of R1850 (US\$97,97) and R22 000 (US\$ 1,167,72). They get subsidies to access housing according to their income through social housing institutions where a project can be supported from 60-70% of the total project cost. There is also Social Housing Regulatory that legalises the affordability of housing by law income and guideline for rent setting. The rent to pay should not exceed 31.5% of total monthly income which is below the 40% of globally suggested to be a burden to renter (Ansell and Cansunar, 2021).

There are also banks and other financial institutions that play a key role in financing housing indirectly. It is estimated that middle- and high-income earners have contracted loans and build backyard houses that are rented to young people and others who want to stay near their workplaces. Due to population growth and migration, the government has now failed to cope with this sharp increase in housing demand (CAHF, 2022). This has given birth to social movements reclaiming land and housing in Cape Town and other cities of South Africa (Plate 3&4). However, the interview with local leaders and influential people revealed that people have rented out their houses or their fathers have denied them a room in affordable housing acquired in past projects.

Plate 3&4: A Cissie Gool House (CGH) sheltering land movements



Source: Author's photograph, 2022

Ethiopia

The report on housing shows that there is an estimated 471,000 that need to be supplied to meet the annual demand for housing. At the same time, there is another burden to address related to maintaining the existing housing stock. Since 2004, Ethiopia has designed an Integrated Housing Development Programme (IHDP) and supplied 2016 a total of 280,000 subsidized condominium units. The programme provided 2% of the demand which made the competition high and prices increased from 200 to 300% for the houses supplied in the programme. The recent programme of IHDP is planning to construct new condominiums in Addis Ababa and urban centres with a total of 750,000 new residential housing units which are estimated to cater to the demand at 30%. by 2020. Furthermore, the programme will rehabilitate 25 % of the existing housing stock(CAHF, 2022).

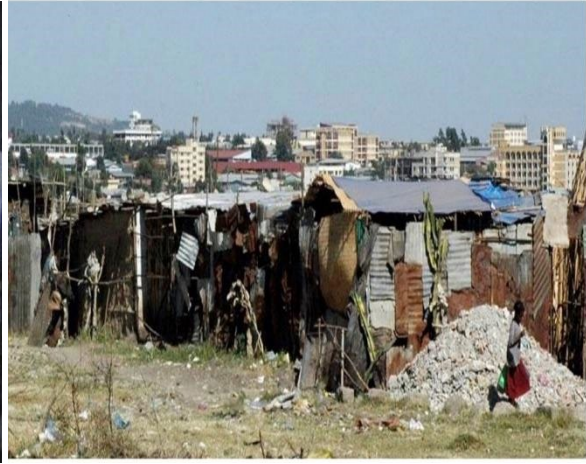
The other initiative related to housing affordability was to reduce the informal settlements by 20% which was successful through upgrading slums and informal settlements coupled with formalisation in Adis Ababa, and other major Cities. However, the remaining informal settlements in small towns have expanded, and new ones were formed due to the failure of IHDP to provide the expected new houses in Addis Ababa and other cities and urban centres of Ethiopia. It is estimated that there were 800000 registered in the IHDP's lottery system on the waiting list up to 2013 when it closed. It is reported that some projects have been put on hold. From that period, the only way to afford to house was to pass through cooperatives and individual initiatives that have not satisfied the market. Not only the satisfaction, but these strategies are in favour of high-income earners. Now Ethiopia is among the countries that have a low level of housing affordability in urban areas with a dominant rental market and with owner-occupied units at only 32.6%.

The observation and KII discovered that the issue of quality is also a problem for some houses individually acquired (Plate 5&6). Houses built in wood/poles and mud as walling materials with roofing in grasses and or plastic sheeting with dirty floors, lacking sanitation, and other services are observed in some urban areas.

Plate 5: Informal dwelling in informal settlements



Plate 6: Informal dwelling around multistorey



Source: Author's photograph

All these homeowners are grouped in 32.6% whereas these houses belong to informal buildings. The major problems of housing programmes and initiatives to fail are summarised as land management issues, insufficient systems of housing delivery, a housing construction industry that is not robust and affordable, and the absence of a diversified housing financing system. The social and political instability came to exacerbate the situation where most of the policies and financial initiatives are concentrated on these issues.

Affordable housing for low-income earners in Ethiopia

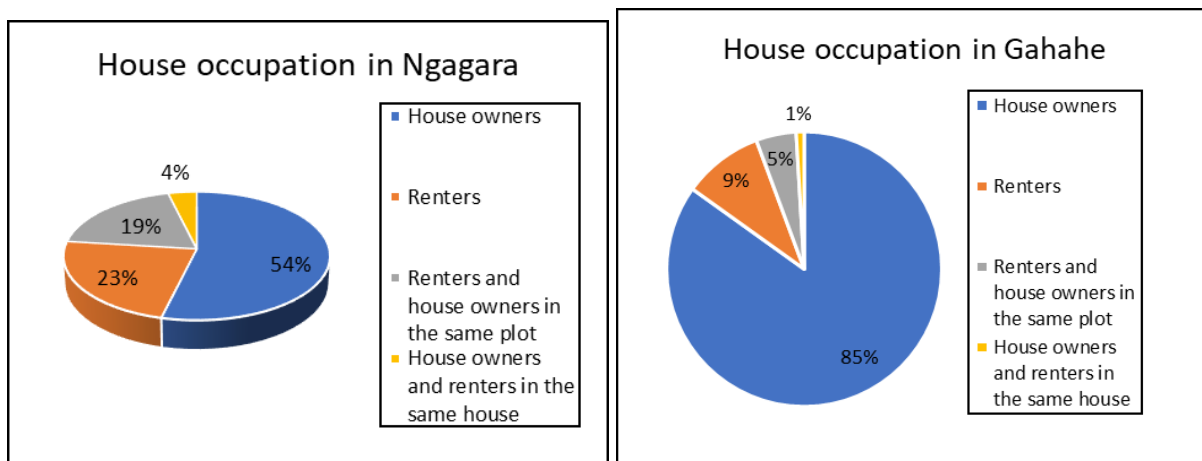
With a low urbanisation level of under 20%, but with a high urbanisation rate of around 5%, and 65% of informal settlements dominated by slums, all these make Ethiopia among the countries where affordable housing becomes a problem. Furthermore, the small GDP per capita of US\$945 can, but is not mandatory an indicator of low-income earners in urban areas to face challenges in affording quality housing. Whereas the new cheapest newly built house is estimated to cost US\$ 17 319, this implies that low-income earners cannot afford this house. Also, a study by CAHF (2022) and (Adeleke and Olaleye, 2020) disclose that a police officer and a teacher can only afford to build a house for less than US\$ 10000 in their career lifetime. Police officers and teachers are among middle-income earners in Ethiopia and what about a typical low-income earner? The government initiatives in affordable housing supply have also been supporting public servants in their projects. The projects for affordable housing supply have been taking place in big cities and big towns (Tadashi and Jonathan, 2015; CAHF, 2020). Rural people are left behind struggling with their means dominated by traditional technologies. Also, these low-income earners have no chance to contract loans from the existing financial institution system (Fekade, 2000; CAHF, 2020). The report by CAHF (2022) and study by (Tadashi and Jonathan, 2015) shows that housing finance in Ethiopia is undeveloped where a big number (more than half) of the housing market is financed informally. The main sources of housing finance are relatives, friends, and savings groups, and mortgage rates of 23%. The desk review shows that low mortgage uptake is linked to high-interest rates, regulatory controls, low incomes, credit risk, inadequate supply of affordable housing, and low financial literacy (Mohammed, 2017; CAHF, 2022).

Also, the issue of land which is still a non-commoditised property according to the constitution⁷ makes low-income earners miss the opportunity to access land for housing and funds through selling and buying. This is one of the strategies many landowners in some countries especially in urban peripheries where land prices are high use to afford housing finance.

Burundi

The housing programmes in Burundi are solely undertaken by the private sector. There is no recent record of public housing programmes from four decades ago. The last government programme was in the 1980s when the then government designed projects for affordable housing for civil servants. This programme was designed after the mass massacre of Hutus where the created neighbourhoods were purely mono-ethnic (Tutsi) and those who were public servants. This programme covered also the construction of maisonettes for soldiers and police which until today exist. It has to be noted that the programme was not even for low-income earners perse, but for those who are working in public services. The issues of housing supplies were left in the hands of private companies and individuals with no support from the government. The report by Kayiira (2022) and Sabuhungu (2015) show also no record of housing programmes in recent years.

Additionally, the effectiveness and efficiency of private companies in providing affordable housing are limited to middle and high-income living low income in the dilemma of poor-quality housing, crowded rooms, and homeless. It was also found that there is no data about housing in terms of statistics on housing ownership and renting. However, the questionnaire results from Ngagara and Gahahe show that you find house owners and renters, renters and owners living in the same plot or even in the same house (chart 1). The same findings show that these two neighbourhoods are settled by middle- and high-income earners dominated by public servants and merchants. Low-income earners are those who are renters and some are living in buildings that are under construction.



⁷ Land and other natural resources belong to the state and peoples of Ethiopia. The land is a common property and should not be sold or exchanged by any means Art.40, Sect.3 (FDRE, 1995)

Affordable housing for low-income earners

Burundi is among the poor countries with US\$250 as a GDP per capita in 2022. The urbanisation level is at 14%, with an urbanisation rate of 5.5% and an informal settlement of 47.7%. The GDP per capita is an indicator that the purchasing power of low-income earners is too low. It is disclosed that to afford the cheapest newly built house you need U\$26 717. Considering the GDP per capita in Burundi, you find that a low-income earner is not capable of collecting such an amount for housing. It is also shown that a teacher and police officer can only afford a house of less than US\$ 10000 and are ranked in the middle income in Burundi. What about low-income earners in Burundi? However, the findings show that around 65% of Burundians live in their houses in urban areas whereas in rural areas we have 98%. Furthermore, social housing covers only 5% of urban areas whereas in rural areas there are no such houses.

Housing finance in Burundi is dominated by private companies and individuals. The public servants have got chance to contract loans from different financial institutions to finance their project of choice. Housing projects have been the priorities where according to the interview and questionnaire in Gahahe Neighbourhood 95% of homeowners contracted loans from different financial institutions, and 65% used loans to renovate their houses four decades ago. This shows that financial institutions play key roles in supporting housing finance in Burundi. The remaining 5% who did not use loans to construct their houses belong to merchants and natives of Bujumbura. The natives 2/5 have sold a piece of land and constructed a modern house in Gahahe when the price of one acre attained 5 million (US\$1500).

The low-income earners are mostly concentrated in rural areas where the price of land does not allow them to acquire a modern house. They are also not able to pay rent for a quality house in urban areas and their income does not allow them to bills in urban areas. In countries like Burundi, low-income earners are found in horrible houses (plates 7&8). All initiatives for supplying affordable housing are designed for city and town dwellers where infrastructure allows.

Plate 7&8: Housing quality for a typical low-income earner in a rural area of Burundi



Source: Author's photograph, 2022

Addressing issues of affordable housing for low-income earners in developing countries has to be contextualised country by country. A low-income earner in South Africa is not the same as in Burundi and Ethiopia when you look at their income. The difference in GDPs per capita is an

indicator that low-income earners are not the same as Yeboua and Jobarteh (2023) generalise. South Africa attests that its big GDP per Capita can contribute to affordable housing. Low-income income who cannot afford the cheapest newly built house can benefit from the social housing institutions that are publicly financed. Looking at the statistics, South Africa has afforded to provide quality houses to preserve the dignity and privacy of South Africans as highlighted by (Ofori, 2020; and AHA, 2022). However, the government failed to revise some legal texts that support encroachers of public lands like wetlands and open spaces. This was also highlighted by Turimubumwe et al. (2022), Nagya and Udoekanem (2022), and UN-Habitat (2011a) in different times and work how governments have been neglecting land management and resulting in encroachment and then informal settlement.

Housing quality for low-income earners is also a problem that is shared by all cases. Issues of housing cost, income, and other factors have been affecting the low-quality that shelter low-income earners as disclosed by (OECD, 2021; and Wilson & Barton, 2022). In South Africa, Ethiopia, and Burundi, low-income earners are living in poor-quality housing in urban and rural areas. In Ethiopia and Burundi, the case is terrible in such a way it is beyond the imagination that there are human beings that can live in such kinds of houses. Governments are there but they have concentrated on other projects of their priority, living behind social housing projects. This supports the conclusions made by Bakhtyar et al. (2013) who for a decade ago saw it. In South Africa, the issue of social housing has been somehow decentralised by delegation where the state agencies are responsible for these projects, but they always underline that the financial support from the government is too low to supply housing according to the supply. In Ethiopia and Burundi, housing programmes have overlapped by financing peace stability and economic reconstruction due to repetitive civil wars or internal security instability. This comes to add up to the history of these countries being shaken by racism, ethnicity, and regionalism that in one way or another still manifest in another image that affects the housing supply as Ansell and Cansunar (2021) showed in some cases; Greenland (1976) in Burundi, Lie and Mesfin (2018) in Ethiopia, and Vuyokazi (2010) in South Africa. Throughout history, low-income earners had not been assisted to afford housing either due to their color, ethnic group, or region.

The last observation is how financial institutions have been not helpful to low-income earners in Ethiopia and Burundi due to their income that does not allow them to pay back the contracted loans. In Ethiopia, with a low level of urbanisation, low-income earners are concentrated in rural areas where the only tangible property they own is the land. Land in Ethiopia is a constitutional issue and no one is allowed to sell it. In another term 'a dead capital' as de Soto (2000) discloses. Due to the low level of certification of such land, a small number of financial institutions do not accept land as collateral. This is not the case in Burundi. People can sell land and engage in other income-generating activities including shelter acquisition. This is even a dominant way of acquiring housing in Burundi specifically in the urban fringe and other small towns. However, the self-finance in Burundi has been criticised as a source of informal settlement and haphazard urban expansion. In a few words, self-finance is the only way that low, middle, and high income are left to finance housing. This affirmation is confirmed by Bakhtyar et al. (2013), UN-Habitat (2008), and CAHF (2022) as the only mechanism to acquire affordable housing. For low-income earners, it becomes again a challenge to them to afford quality housing in terms of type and location. They

find themselves in informal dwellings and informal settlements for those in urban areas. Those in rural areas, find themselves in poor-quality housing that does not give them dignity and privacy.

Conclusion and recommendation

The affordable housing problem for low-income earners is a serious problem that needs to be contextualised rather than generalised. This study has shown that the low-income earner in South Africa does not suffer the same as a low income in Burundi or Ethiopia. In South Africa, the government has given priority to low-income earners to access affordable housing through social housing projects. This was not in Burundi and Ethiopia cases. The governments in Burundi and Ethiopia did not afford to provide affordable housing for low-income earners but civil servants who could afford to pay have been served by the existing private housing finance mechanisms. Furthermore, the low level of urbanisation in Burundi and Ethiopia coupled with civil wars are presented as a problem to support low-income earners to access affordable housing. Projects related to peacebuilding and socio-economic reconstruction projects are given priority to the detriment of housing projects.

This paper finalises by recommending that developing countries adopt the South African model in providing affordable housing to low-income earners where every citizen is entitled to have shelter. However, it has a strong land administration system and legal texts that prohibit encroachment. Low-income earners as those we observed in Burundi and Ethiopia should be given priority in affordable housing projects. Middle- and high-income earners should be supported by financial institutions and cooperatives for housing finance.

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Declaration of Interest statement

The authors report that there are no competing interests to declare.

Notes on Contributors

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**Peer Reviewed*

An Evaluation of Compensation Valuation Practice in Nigeria

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Abstract

The paper evaluates the practice of compensation valuation in Nigeria in the context of statutory provision and existing Nigerian Valuation standard with a view to determining if the valuation represents a fair and adequate compensation. The study reviewed existing rates in line with economic realities. Case study valuations were undertaken to demonstrate the adequacy or inadequacy of the existing practice.

Findings from the study indicate that the existing valuation practice represents an undervaluation of affected assets, which could lead to dissatisfaction by project affected persons. The practical implication of this is that it could lead to disturbance and delay in project implementation. The study recommends a review of existing statutes and correct application of valuation standard as contained in the statutes and the provisions of the new Nigerian Valuation standard with regard to compensation to enhance fairness in compensation valuation.

Keywords: Compensation; economic-value; rates standards; valuation.

Introduction

In this paper, we are dealing with adequacy of compensation payment arising from compulsory acquisition of land, structures, economic trees and crops. Compensation could arise from loss of assets with spiritual and cultural values like shrines, bad bush, burial grounds, streams and rivers, places with spiritual values, pollution, loss of water rights, economic displacement leading to loss in means of livelihoods, people who suffer hazards and shocks etc. In Nigeria and some other countries compensation valuation is statutory in nature. Situation do arise, where there is a lot of inconsistency in the valuation for compensation claim by different valuers due to wrong interpretation and application of statutory provisions for compensation valuation. Whatever is the case, valuers in every clime must speak with one voice and be guided by specific standards that will introduce consistency, uniformity and reliability in the valuation of assets for compensation. In the absence of standards, the outcome is chaos and anarchy.

It is important that both valuers and acquiring authorities do recognise the importance and sensitivity attached to land and related assets by indigenous communities who in most times depend on natural capital for their survival. Land is a source of wealth and plays a major role in the existence and survival of mankind. Whenever we touch on land, we touch on everything. It means life to many and source of capital to indigenous communities. In consequence we must ensure fair and adequate compensation whenever land is acquired compulsorily.

There will always be a need for government to acquire land for public interests like roads, schools, rail line etc. This must however be carried out in the line with statutory provision because an authority cannot normally, without a clear statutory authorisation, take rights over land. The above statement is buttressed by Lord Denning MR (Master of Rolls as he then was) In the case of *Prest v Secretary of State for Wales*. He stated inter-alia:

That it is clear that no minister or public authority can acquire any land compulsorily except the power to do so be given by Parliament; and that Parliament only grants it, or should only grant it where it is necessary in the public interest. In any case therefore, where the scales are evenly balanced for or against compulsory acquisition, the decision by whomever it is made should come down against compulsory acquisition. I regard it as a principle of our constitutional law that no citizen is to be deprived of his land by any public authority against his will, unless it is expressly authorized by parliament and the public interest decisively so demands. If there is any reasonable doubt on the matter, the balance must be resolved in favor of the citizen. (Egbenta and UdoUdoh (2018)).

Also, section 44 (1) of the Nigerian Constitution (2018) as amended states as follows:

No moveable or any interest in any immovable property shall be taken possession of compulsorily and no right over or interest in any such property shall be acquired compulsorily in any part of Nigeria except in the manner and for the purposes prescribed by law that among other things -

Require the prompt payment of compensation thereof; and gives any person claiming such compensation a right of access for the determination of his interest in the property and the amount of compensation to a court of law or tribunal or body having jurisdiction in that part of Nigeria

In the light of the above, it is crystal clear that entitlement to compensation is a legal right enshrined in the constitution of the federal republic of Nigeria. However, taking a deeper look at the provisions of sec 40 (1) of the constitution that any right in property acquired compulsorily must be compensated for but the Land Use Act precludes compensation for interest in undeveloped land. It only allows for a refund of rent (ground rent) if paid. If you have not paid your ground rent on the year of acquisition, no refund or payment will be made to you. Many states including the federal government collect premium (sometimes running in millions of naira) from allottees of land including development levy, without provision for the refund of such a huge amount paid into the government treasury when land is compulsorily acquired. This author submits that there is a need for a judicial interpretation of section 44 of the constitution with respect to payment of compensation for undeveloped land. The question here is, what is the difference between refund and compensation. The occupier or owner of an interest in land pays an annual ground rent for the use of land, the government acquires the land compulsorily, refunds the ground rent paid for that year. The owner is deprived of the use of the land for the unexpired tenure and receives nil compensation for being deprived of the right for continued use of the unexpired interest in his land; What if the land has just been disposed for the sum of 80 million naira and the vendor goes away with the sale proceeds and after one year, the land is acquired compulsorily by the government. The new owner gets nothing. What then is the spirit and purpose of the Land Use Act? To bring hardship and poverty on the citizens?

According to Kasumu (2022), the obligation of the government to compensate for expropriated privately owned land in Nigeria is a major issue affecting fundamental human rights. Compensation should not make a dispossessed person worse off. Can we say that compensation under the Land Use Act is fair and adequate. Odudu (2002) cited in Otegbulu (2005) opines that the Land Use Act is faulty in guaranteeing fair compensation as; it is obvious that the laws as they stand do not guarantee the claimant fair and adequate compensation as provided in Sec 44 of the 1999 constitution of the Federal Republic of Nigeria. Efforts should be made to address this issue constitutionally and under fundamental human rights.

The focus of the study is to evaluate the provision of the relevant laws guiding valuation (including the relevant provision of the Nigeria Valuation Standard) for losses arising from compulsory acquisition, and damage/injurious infection to land with a view to:

- demonstrating their application in compensation valuation by practitioners in the study areas.
- the adequacy of the valuation outcome based on statutory provisions.
- how the provision of the Nigerian valuation standard 2023 can help in enhancing the adequacy of compensation payable.
- to apply Total Economic Value (TEV) concept in the determination of compensation under the existing practice by valuers in the study area.

Literature Review

The need for the government to acquire land for public purposes gives rise to compulsory acquisition which could be described as involuntary displacement. It (compulsory acquisition) is the power of the government to acquire private land for public purposes in violation of the willing consent of the owner Keith (2008 cited in Lindsay 2012). This power is called by different names depending on the country's Legal Systems. They include: expropriation, eminent domain, taking and compulsory purchase. (Lindsay (2012)). It is a useful tool that helps the government to acquire land when needed for public infrastructure and related projects considering the limitation of the existing land market in being able to meet this essential need. Involuntary displacement has a lot of consequences on the affected communities. Whenever people are displaced, they suffer both physical and economic displacements. There is the human cost with regard to disruption to community cohesion, livelihood pattern and way of life, difficulty in adjusting to new environments, dislocation from the sources of means of livelihood etc. Displaced persons must also be adequately compensated in the context of the above.

Relevant Laws

Land Use Act Of Compensation

The principal law guiding compulsory acquisition and compensation in Nigeria is the Land Use Act of 1978 now known and cited as CAP 15 laws of the Federal Republic of Nigeria 2007. The

other laws are Sec. 44 of the Nigeria constitution, Mineral Act No. 24 of 1999 and Petroleum Act CAP 338 of 1990.

Section 29(i) of the Land Use Act states that if a right of occupancy is revoked for the cause set out in paragraph (b) of Subsection 2 of Section 28 or in paragraph (a) or (c) of Subsection (3) of the same section, the holder and the occupier shall be entitled to compensation for the value at the date of the revocation of their unexhausted improvements.

If the right of occupancy is revoked for the cause set out in paragraph(c) of Subsection (2) of Section (28) or in paragraph(b) of Subsection (3) of the same Section, the holder and the occupier shall be entitled to compensation under appropriate provisions of the mineral act or the mineral Oils Act or any legislation replacing the same.

It further states that compensation under this Subsection shall be

The Land — For an amount equal to the rent if any, paid by the occupier during the year in which the right of occupancy is revoked.

Buildings, installations or improvements thereon will be the replacement cost less any depreciation.

Crops and economic trees. An amount equal to the value as approved by the appropriate officer

According to Ajibola 2013 section 29 of the Land Use Act provides compensation for only land, buildings, installation and improvement thereon, and crops, while The Petroleum Act Section 11 (5a) considers compensation for building crops and profitable trees. The aftermath of this undercompensation is dissatisfaction among displaced person and victims of pollution in the oil communities and other parts of the country (Otegbulu 2013, Ajibola 2013, and Egbenta 2010).

Akujuru 2013 is of the view that the major reason for low compensation payment is poor interpretation of the relevant laws in addition to poor understanding of the Concept of Replacement Cost.

The appropriate officers who should guide valuers are often more of the problem than the solution. For the avoidance of doubt the appropriate officer is either the Director of Land in the state or Federal Lands Department. It should also be noted that in almost all the cases the appropriate officer is a qualified Estate Valuer whose practice is regulated by the Estate Surveyors and Valuers Registration Board of Nigeria (ESVARBON). It has been argued by Otegbulu (2013) that ESVARBON should provide a standard for Compensation practice that will guide the appropriate officer in the discharge of both his Statutory and Legal functions under the Act.

Compensation paid should not place the displaced person in a worse position than he was before the displacement. A general and long standing view is that compensation should be guided by the objective of equity and equivalence. By implication, the adequacy of compensation should be measured against the benchmark or goal of ensuring that people are neither impoverished nor enriched (Lindsay 2014). The author further submitted that:

“Displaced persons should be assisted in their efforts to improve their livelihood and standard of living or at least restore them, in real terms to pre-displacement levels or to levels prevailing prior to the beginning of proper implementation which ever is higher.”

This is important particularly in the rural areas where the livelihood of the people depend on natural capital. When you touch on Land, you touch on their very existence.

FAO (2009) stated certain principles that need to be satisfied in a proper compulsory acquisition and compensation process, which is that the procedure should safeguard the rights and interest of the people who lost their rights or ownership through displacement of their land. There should be equity and transparency.

Adequacy of Compensation

The need for adequacy of compensation particularly for project affected persons is very much highlighted by the World Bank in their policy on involuntary resettlement as contained in OP 4.12. In the document, it is stated that displaced persons should be assisted to improve the livelihoods and standards of living or at least restore them in real terms, to pre-displacement levels existing before the commencement of project implementation. By implication, this involves payment for or provision of alternative accommodation, loss of income and all other costs that will restore the affected person to pre-project implementation level. Under the Land Use Act some claims like land and loss of income or business are not paid for. As earlier mentioned, Akujuru (2013) is of the view that the major reason for low compensation is the definition of the compensation concept and the meaning of replacement cost provided in the enabling laws which is differently interpreted by different professionals depending on whom they represent. If they represent the claimants they will want to insist that replacement cost should not be depreciated while the reverse becomes the case when they are representing the acquiring authority. In the same vein, Akujuru (2013), Otegbulu (2013) and Odudu (2002) state that the application of fixed rates for the valuation of crops and economic trees is not supported by any known statutes but promoted by appropriate officers out of ignorance, hence the need for standardisation of compensation valuation practice. Maraph and Zakariyyah (2020) argued that compulsory land acquisition has generated a lot of crises over the years due to the failure of the acquiring authority to pay adequate compensation on the guise that its operators are guided by the provisions of the law. They further stated in the findings of their study that methods of compensation valuation are inequitable, unfair to the claimants and negates the principle of equivalence which requires that claimants should not be

better off or worse off after acquisition. Without doubt, fair and adequate compensation is a fundamental human right which is clearly entrenched in the African Charter on human rights.

Natural Resource Valuation and Total Economic Value

It is a framework developed to characterise why and how individuals value the benefits received from the environment. The most obvious reason is that we personally found many uses of the natural environment directly (e.g by eating food grown in our fields) and indirectly through process that recycle nutrients in the soil and make them available to crops, now and in the future. This is use value. we also have benefits knowing that the environment we do not currently use will be there if we need them in the future (a bit like an insurance policy). This is option value. It can also be used for the benefits of future generation. This is bequest value and for the sake of nature. This is existence value. The last three are grouped as non use value. Total economic value in this context refers to the sum of use, option and non use value (Ozedemiroglu and Hails, 2016 and Emerton, 2018)

The notion of Total Economic Value (TEV) provides an all encompassing measure of the economic value of environmental assets. It decomposes into the use and non use values. The idea behind the TEV approach is that any good or service is composed of various attributes, some of which are concrete and easily measured, while others are more difficult to quantify. The total economic value is therefore the sum of all these components, not just those that can be easily measured. They include use and non use value ACROS Network (2014). We also have direct and indirect use value.

In the valuation of economic trees in Nigeria, concentration is on the trunk or timber to the neglect of the Non Timber Forest Products which have been defined as those goods, services and amenities obtained from forested areas that derive their worth independent of the economic value of the merchantable timber in the area under consideration. Some of these include; mushrooms, medicinal herbs, edible vegetables, insects, crawling plants, climatic and ecological functions etc.

According to Obot (2002), preliminary ethno botanic surveys in Cross River National Park by Okafor (who carried a survey in the area) indicates that in the village of Okwangwo, for example, a woman spends one day in the forest and collects on the average ten (10) bundles of Okazi

(*Gentum Africanum* and *Gentum Bucholizianum*). She sells these at the Cameroon border village of Obonyi at 100-franc CFA (N14) per bundle (The price today should have gone up to between N1500 to N2000 per bundle).

If we consider the days spent (annually) in the collection exercise and the number of women actively involved and then average over the fifty nine (59) villages within the support zone of the park, the export revenue from this will be substantially higher. Obot (2002) indicated that there are other forest revenue sources from the forest which were not taken into consideration in the studies by Okafor. These include: bush onion (*afrostyrax ludophilus*) bush mango (*irunnigia garbonesis*) and *racinodendrom hedolelotil* (Okpasi in Nigeria and Njasan in Cameroon) which are all exported to the Cameroon; and the value of some 15 seeds, 3 oil seeds, 44 fruits, 13 spices, 25 mushrooms and 69 medicinal plants; collected and utilised by forest dwelling people. It will therefore be obvious that Okafor's estimate of \$300 billion (as the true value of the forests) is conservative as at the time of the survey and more conservative today on the basis of the above illustration. This shows the importance of non-timber forest products in the valuation of natural assets.

Methods

The paper is concerned with evaluating the practice of Compensation valuation by Nigerian valuers in the context of existing statutes, guidelines and standards with a view to determining its adequacy.

The study is based on existing compensation rates as provided by the National Technical Development Forum (NTDF) on land administration and the Oil Producers Trade Sectors (OPTS) an arm of the Lagos Chamber of Commerce and Industry (LCCI). These two bodies produced the rates used in the computation of compensation under the Land Use Act (for public acquisition) while OPTS is used for Oil Industry related compensation activities. Economic Valuation will be carried out to determine if the rates being used are reflective of the economic values of the crops and economic trees.

Data used will be mainly from rates produced by the Federal Ministry of Works and Housing through NTDF and the oil producers trade sector. Prices of crops will also be obtained from the

local farmers and farm gate. Information will also be obtained from the relevant section (Chapter 4) of the revised Nigerian Valuation Standard on compensation. Valuation will be carried out in line with the NTDF and OPTS rates and compared with the one based on total economic value of the economic trees in line with the Nigerian Valuation Standard.

Findings

We can now look at the rates used for the determination of compensation of crops and economic trees in line with both the recommendation of the appropriate officer and that of the Oil producers Trade Sector. (OPTS). OPTS have their own rate which is now obsolete. Neither of the rates was market derived. They were not based on the economic productivity of the economic trees and crops. The total economic value was not considered.

They also did not take into consideration Non timber forest products (NTFPS) which often command higher value than the timber trees.

Recently, some oil companies have revised their rates by updating them to something near to economic realities, shell petroleum now has a new rate which is a great improvement from the obsolete OPTs rate. This is not, however, considered in this study.

In the old OPTs rates, the following were applicable since 1997 and beyond.

Table 2: Level of maturity and compensation

NTFPs	Mature (N)	Medium (N)	Seedling (N)
Mango improved variety	1000	500	250
Coconut	600	300	150
Orange	600	300	150
Rubber	400	200	100
Bush Mango	680	340	170
Garcinia kola	320	160	80
Camwood	80	40	20

Sources: (OPTS, 1997)

If for example through the activities of the oil company a person suffers the following losses” as in table 3 below

Table 3: Level of maturity and compensation

NTFPs	Level of maturity of NTFP and compensation paid (₦)		
	Mature (₦)	Medium (₦)	Seedling (₦)
Mango (improved variety)	1000	500	250
Coconut	600	300	150
Orange	600	300	150
Rubber	400	200	100
Bush mango (<i>I. gabonensis</i>)	680	340	170
Garcinia Kola	320	160	80
Camwood	80	40	20

Sources: (OPTS, 1997)

If through the activity of an oil company a person suffers the following losses:

Table 4: Level of maturity and compensation

NTFPs	No. of NTFPs lost	
	Mature tree (₦)	Medium-sized tree (₦)
Mango	20	15
Orange	10	20
Rubber	150	100
Bitter leaf	10	6
Camwood	10	4

Sources: (OPTS, 1997)

The valuation will be thus:

Table 5: Mango

Description	Classification	
	Mature tree (₦)	Medium-sized tree (₦)
Rate (N)	1000	500
Quantity	20	15
Compensation (N)	20,000	7,500

Table 6: Orange

Description	Classification	
	Mature tree (₦)	Medium-sized tree (₦)
Rate (N)	600	300
Quantity	10	20
Compensation (N)	6000	6000

Table 7: Rubber

Description	Classification	
	Mature tree (₦)	Medium-sized tree (₦)
Rate (N)	400	200
Quantity	150	100
Compensation (N)	60,000	20,000

Table 8: Bitter kola

Description	Classification	
	Mature tree (₦)	Medium-sized tree (₦)
Rate (N)	320	160
Quantity	10	4
Compensation (N)	800	960

Table 9: Camwood

Description	Classification	
	Mature tree (₦)	Medium-sized tree (₦)
Rate (N)	80	40
Quantity	10	4
Compensation (N)	800	160

Table 10: Summation

NTFPs	Total Communication (₦)
Mango	27,500
Orange	12,000
Rubber	80,000
Bitter	4,160
Camwood	960
Grand total of compensation	124,620

The above compensation is inadequate as will be shown below. It does not discount for the future value of the NTFPs. From our survey, one orange fruit sells for N5 – N20 depending on the size and season. One healthy tree can yield a minimum of 1000 fruits annually.

- (a) Let us assume the basic rate of 5.00/fruit as indicated by our survey.

Total gross income = N500

Less expenses at 30% N150

Net income N350

Using the income capitalization method:

Net income: N3,500

Yield per annum at 10% for 15 years: 5,56659

N19,491.50 x 10
= N194,915.00

Assumptions

Our illustration is based on the following assumptions: (i) 15 years productive life for an orange tree (ii) Opportunity rate of return based on saving account interest rate as there is no market based rate, and (iii) Exchange rate of US \$ = N125/N135.

In the above valuation we considered the fruit product of the orange tree. In the first valuation for orange we applied the OPTS rate produced by the oil companies, and for the matured orange tree, the total compensation value was N600.00 as against N194,915 using market based variables. The different in the two approaches reflects a difference in excess of 3000 per cent.

The same situation prevails with regards to other NTFPs. For instance, for bitter kola, one-piece of the fruit sells for between N5 and N10.00. Apart from being chewed, it has medicinal use. Camwood also has cosmetic use. The point being made is that the full utility of the plant is not considered in fixing the rate by both OPTS and NTDF. The OPTS rate was prepared and has been in existence since 1997.

Other issues in environmental valuation include loss of fishing rights, loss of income from polluted land. The proper approach in the case based on scientific study. The net income so arrived at to be capitalised or discounted.

In valuing loss of fishing right, the likely number of fisherman in the community is determined as a proportion of the population. The income of an average fisherman is also determined. This is also capitalised or discounted for the duration, which may be temporary or permanent. The valuation takes the same process as that of the economic trees.

This calculation was carried out in 2004 using the prevalent rates then. Estate surveyors were gladly using the rates prepared by a body not legally or professionally trained to provide valuation standards like the OPTS

No body queried it including The Estate Surveyors and Valuers Registration Board of Nigeria. Between the years 2006-2008, “the National Technical Development Forum (NTDF) on Land Administration developed a harmonised rate for compensation valuation in the country covering:

South East

North Central

South West

North East

North West

South South

We Shall make extracts on compensation rates for some zones for the purpose of analysis.

Table 11: North Central

NTFPs	Mature (₦)	Immatured (₦)	Seedling (₦)
Banana	1000	600	300
Bush Mango	3000	1800	900
Mango (plantation)	4000	2400	1200
Mango (wild)	3000	1800	900
Oha	500	300	150
Orange (Plantation)	4000	2400	1200
Orange (wild)	3000	1800	900
Palm tree (Plantation)	3000	1800	900
Palm tree (wild)	2000	1200	600

Sources: (NTDF 2006)

Table 12: South – South Geopolitical Zone

NTFPs	Mature (₦)	Immatured (₦)	Seedling (₦)
Banana	800	400	200
Bush Mango	2000	1000	500
Mango (plantation)	2000	1000	500
Mango (wild)	-	-	-
Oha	500	250	125
Orange (Plantation)	2000	1000	500
Orange (wild)	-	-	-
Palm tree (Plantation)	600	300	150
Palm tree (wild)	1500	750	375

Sources: (NTDF 2006)

In the south south geopolitical zone, there is no classification for wild and plantation species with respect to mango and orange. The pricing or measurement of the economic tree seems to be influenced by the principles of scarcity create value. A plant is priced higher in areas where it is not in abundance.

The price per unit of tree within a plantation is higher than the wild one but in real life, organic plant products are priced higher than the non-organic plant products. It is also important to note that some plants have multiple functions hence their value can only be adequately captured through application of their Total Economic value where all the uses are put into consideration. For the avoidance of doubt, Total Economic Value is the value of all economic benefits that a society

derives from a resource. Using a forest resource as an example, the total economic value (TEV) entails well beyond timber and accounts for a large variety of market and non market functions and services provided by a forest system Total Economic Value comprises Use (UV) and Non-Use Value (NUV). Use value is divided into Direct (DUV) and In-Direct Use value (IUV). Non Use Value (NUV) consists of bequest, option and existence value. For our purpose, we are interested in only use value. For example a palm tree provide the following uses:

Broom

Palm oil

Palm wine

Basket

Soap

Palm kernel

Palm kernel shell

In 2009, a study to determine the total economic value of a palm tree was carried out by us for sixty (60) palm trees. The sixty palm trees will yield approximately 600 fresh fruit bunches per annum which will produce 2.5 tones of palm oil, 0.5 tonnes of palm kernel oil at an output rate of 0.22 tonnes of oil and 0.44 tonnes of palm kernel oil per fresh fruit bunch.

The current market price (in 2009) was N36,000 per tonne for palm kernel and N60,000 for oil palm. Each palm tree can produce 5 no brooms and 4 baskets from palm fronds annually. Revenue from soap is about N150 per annum per tree. It should be noted that when a palm tree is being tapped for palm, wine, palm fruit will not be produced.

Income summation/valuation

	N
Income from palm kernel (0.5 x N36,000)	18,000
Income from palm oil (2.5 x N60,000)	150,000
Income from benefits/broom	26,700

Income from soap	9,150

	₦203,850.00
Less production cost/expenditure	
@ 30%	61,155
Net Income	
	N142,695
Yp @ 10% for 30- yrs	9.4269

Capital value for 60 palm trees	N1,345,171.49
Capital value of 1 palm tree = ₦22,419.52 Say ₦22,000.00	
Bequest value	NA
Existence value	NA
Option value	NA
Value of 1 palm tree	----- N 21, 000

The above study was based on the south south and south east average for palm tree. The life of a palm tree is estimated at 30 yrs. Kola nut 30 yrs, coconut 25 years bitter kola 40yrs, okazi regenerates.

From the rates provided by NTDF palm oil tree is N2000 per matured tree in the North central and N1500 in the south south. The difference between the capital value and NTDF rate is wide and alarming in 2023. The economic output of each plant should be the main determinant of the value of any economic tree.

The rates in all the zones have no bearing to the economic productivity of the plants under consideration. For instance, in the south west zone, a stand of Avocado tree is N900.00. What is the price of one Avocado fruit in the market? The farm gate price anywhere in the south or north is more than N100.00. In the open market the price is between N150 to N500 per fruit. A tree can produce 1000 or more fruits in a year. In the North east zone a Mango tree stand is N3,500 for the wild type and N5000.00 for improved type while Banana is N1500.00 per tree stand. What is the price of a Mango fruit and a bunch of bananas consisting of 15 fingers compared to the value of the tree stand. In Abuja a good bunch of bananas (10-15 fingers) is between N700 and N1500 depending on the size while a Mango fruit is between N50 to N150 depending on the species.

Structures

When structures are subject to compulsory acquisition, there is a recommended rate for the computation of compensation value for affected structures like buildings, fences, roads, pavements etc.

The most recent one is the one released by the Federal Deputy Director of Quantity Surveying of the Federal Ministry of Works and Housing in 2018

	Constructive Rate/m ²
(a) Tenement Building	55,000/m ²
(b) Muld Building	30,000/m ²
(c) Storey Building	70,000/m ²
(d) Duplex Building	70,000/m ²
(e) Bungalow/Boup orinten	57,000/m ²
(f) Generator House	92,000/m ²
(g) High Rise Building	148,000/m ²
(h) Fence Wall	18,000/m ²
(i) Paved Areas	7000/m ²
(j) Block of office	65,000/m ²

- | | | |
|-----|---|-----------------------|
| (k) | Lockup shops | 58,000/m ² |
| (l) | Open shops | 45,000/m ² |
| (m) | Uncompleted structures depending
on the completion stage and type of structure | |

The construction rates have a good element of professionalism in them. However, there is need to indicate that the rates should be adjusted where necessary, for instance in cases of where the soil is swampy, rocky or other form of difficult terrain. Variation could also be made where the quality of construction material is outstanding and vice versa. There is a need to review the concept of exhausted improvement as it will be impossible to replace the structure with an old and similar structure. This is very critical when we consider the fact that the government is not paying for land but only structure. There is also the problem of partial demolition where part of a compound is demolished, and compensation is pro-rated. Some properties cannot revert to their original use due to partial demolition particularly where such partial demolition constrains the property from meeting the legal requirements for its original use. How do we resolve this? Directors of land in different states confirmed that this is a major problem, and the consensus is that full compensation should be paid for the entire property.

Valuation for Revocation and Compulsory Acquisition Under ESVARBON Valuation Standard (New Edition)

Standards For Compensation Valuation For Valuers

The Land Use Act is the principal law for compulsory acquisition and compensation in Nigeria. It is expected that all qualified valuers should have good knowledge and mastery of the provisions of this act particularly s.28 (2) (b) or s28(3)(a)(c), respectively and S29.4 (4) which makes provision for what should be compensated, known as the heads of claim S.29 (4) to (b) deals with modalities for computation of compensation. This notwithstanding, valuers must ensure that value determination or measurement is carried out with the highest professional standards. No person or group should direct or provide guidelines for the valuation of asset acquired compulsorily under

this act or any act related to compulsory acquisition outside the standards set by the board (ESVARBON) for the determination of compensation payable. S.29 (4) deals with compensation for buildings, installations, or improvements. The act provides the use of replacement cost less any depreciation together with interest at bank rate for delayed compensation. It further states that the cost may be assessed on the basis of the prescribed method of assessment as prescribed by the appropriate officer. The board shall from time to time working with appropriate bodies or persons provide current construction rates for different regions in the country. For no reason should any valuer adopt an obsolete construction rate in the determination of depreciated replacement cost for buildings, installation and improvement. In situations where no current construction cost is provided the valuer must ensure that the rate used is not obsolete and that his recommended value does not in any way further impoverish the project affected persons (PAP)

S29 (4)(c) deals with compensation for crops and economic trees. The act provides that compensation should be an amount equal to the value as prescribed and determined by the appropriate officer. A valuer should avoid the use of arbitrarily fixed rates for the determination of crops and economic trees. The act never stated that valuers must use Nx per crop or economic tree. The board should assist the appropriate officers in producing economic values for crops and economic trees which should be used by valuers. Valuers must not use rates less than the economic worth of the crops and economic trees. For income producing crops, economic trees or farms, the valuer will discount the loss of income for the duration or economic life of the crops or tree or farm at an appropriate rate of interest.

In the case of contamination of water body, the compensation shall be determined by the annual loss of net income lost by the affected community compounded or discounted at an appropriate rate of interest. When the contamination affects households' source of drinking and cooking water, the valuer should determine the average quantity of water per household and find out the cost of equivalent amount of water from water vendors in the community and multiply the amount per household with the total number of households in the community. The quantum of water loss by the community will be discounted or compounded at an appropriate rate of interest. Whenever the contamination has persisted for a number of years, the loss of money or income will be compounded using an amount of N1 per annum. In situations where the loss or contamination is

just beginning, the likely loss of income should be discounted for the expected period of contamination.

Compensation For Juju, Shrines And Sacred Bushes

Shrines come in different forms as in some communities, trees and water bodies like streams and lakes are worshiped. Shrines can also be in a shelter and in houses or on land decorated with objects and carvings. Some shrines have healing powers, while some are ancestral homes, deities and protector of the people. Valuers must consider the following factors in determining the compensation for shrines, juju and sacred bushes:

1. **Appeasement sacrifice:** the valuer will find what will be purchased for the appeasement of the deity which may include cows, goats, chickens, yams etc
2. **Cost of relocation and restoration sacrifice:** there are costs to be incurred in relocation. After the relocation, costs will be incurred to restore the spiritualities. There will also be communal sacrifice which may involve the elders, custodians of the shrine, priests, women, children, dancers, drum beaters and dance groups, food and drinks for ceremonies.

Determination of Compensation in Projects Funded by Donor Agencies

Valuers may be invited to determine compensation for compulsorily acquired land for projects funded by international donor agencies like the World Bank, International Finance corporation (IFC) etc. The valuer under this situation should adhere to the guidelines for compensation guiding the operations of the funding agency.

Determination of Loss Due to Contamination Illustration: There was a case in Delta State, Nigeria, where emission from a Power Holding Company of Nigeria (PHCN) power station into the river destroyed sea live with the result that the fishermen whose means of livelihood is tied to their work as fishermen could no longer earn a living. The community made their claim 14 years after the commencement of the emission.

If for example there are 200 No fishermen in the community earning N60,000/month per fisherman. There income for one year will be:

$$N60,000 \times 12 \times 200 = N144,000,000.00$$

Gross income = N144,000,000

Less outgoing @ 30% 0.7

Net income 100,800,000.00

Amount of N1. P.a. @

10% for 14 years 7.3667

N742,563,360

If the pollution just commenced a few months ago and we anticipate that it will take 14 years to correct, the compensation will be:

Net Income - N100,800,000

YP@ 12% for 14 yrs 4.7368

N477,49,440.00

Most valuers discount loss in income in all situations irrespective of whether the loss is part or futuristic as in the case above, where the valuer adopted discounting method instead of compounding which should have given the claimants a higher value.

The correct method must be used in each situation to arrive at an appropriate compensation.

Contamination of water bodies can also lead to loss of source of water supply to the community.

If for example there are 500 households in the community and an average household consumes 200 litres of water a week which costs N3000/household through alternative water supplier. This implies that the 500 households will spend:

$$N (500 \times 3000) / \text{week} = N1,500,000$$

For one year it will be:-

$$N1,500,00 \times 52 = N78,000,000$$

The advise here is that government should pay for one year and then provide an alternative water supply for the community.

Compensation For Juju Shrine Sacred Land And Sacred Bushes

Compulsory acquisition and revocation at times affect sites with high spiritual and cultural value, sacred sites, shrine juju and bad bushes. Any valuer confronted with this assignment must familiarise and educate him or herself with the importance and value attached to each of them by the community. He should find out the level of sacrifice and ceremonies required for the relocation of the site taking into consideration all legal actions required by the chief priest, the community or the family in the case of a burial ground.

All over the world, cultural and spiritual values are recognized.

Shrines and related assets may require a lot of sacrifices to be relocated. This may include slaughtering of cows, goats, chicken, yams, drinks, ceremonies etc.

Example:

The following items after investigation and discussion with Chief Priest will be required for the appeasement and restoration of a Juju Shrine:

	N
1. 30 bottles of illicit Gins at N5,000 each	150,000
2. 10 tins of local gin at N10,000 each	100,000
3. 200 Kola Nuts at N300 each	60,000

4. 1 live monkey at N25,000 each	25,000
5. 2 live tortoises at N5,000 each	10,000
6. 10 white cocks at N6,000 each	60,000
7. 2 live cows at N450,000 each	900,000
8. Payment for dance group and entertainment at N150,000 each	150,000
9. 4 tins of honey at N50,000 each	200,000
10. 5 live goats at N80,000 each	400,000
11. 200 cowries at N500 each	10,000
Total	N 2, 065,000

This is the compensation to be paid for the appeasement of the juju shrine. This is in addition to the cost of any structure to be rebuilt. There is no room for undervaluation under this situation unless the valuation is incompetent and in experienced

Other Issues

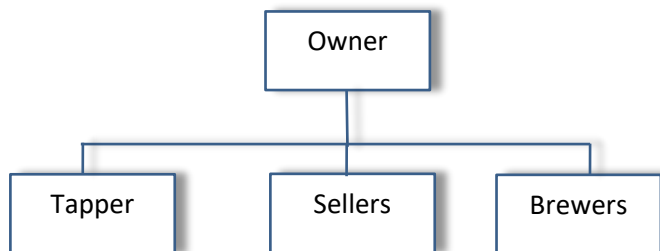
It should be noted that some of the items under consideration during revocation compensation assessment should not be treated in isolation. Some of them consist of several economic activities with associated value chain.

For example a raffia palm tree has an average life span of 25 years and can earn a net income of N15,000 per annum. If we assume 30% expenses we have a net income of N10,500.

Net Income	N10,500
Yp for 25yrs @12%	<u>6.2489</u>
	N65,613
	Say N66,000.

In addition to the above, there are other chains of income activities connected to raffia palm the wine tappers earn their income from it, the vendors earn income too. The product is also used for

the production of local gin which is very popular in the Niger Delta. Those that brews the gin earn a living from it and those that sell the brewed gin earn their own income from it also. There is a chain of economic activities and associated value chain.



Chain of income earners in a Raffia Palm

Summary of Findings

- There is obvious variance in the provisions of Section 44 of the Nigerian Constitution and the provisions of the Land Use Act of 1978 with regard to compensation valuation.
- Rates recommended by appropriate officers for valuation of crops and economic trees are not based on the economic productivity of the items under consideration.
- Preference for trees against Non Timber Forest Products (NTFPs) places displaced persons at economic disadvantage with regard to payment of compensation.
- Most valuers are yet to understand where to use discounting and compounding techniques in dealing with pollution or contamination issues
- Premium paid by allottees are not taken into consideration in the determination of compensation for land.
- OPTS have no business in producing compensation rates as they lack the professional competence to do that

Discussions

It is obvious that the practice of compensation valuation in Nigeria falls short of international best practices leading to undervaluation and inadequate compensation in most cases. The practice lacks equity, transparency and constitutes a breach to the citizens right as provided in the Nigerian constitution and African Charter on Human Right for fair and adequate compensation. The use of arbitrary fixed rates for economic trees and cash crops is not in compliance with any law and can

lead to protests by project affected persons thus disturbing execution of public project. The government rate provides between 1,500 Naira to 2,000 Naira per palm tree while the economic value of a palm tree is about 22,000 Naira in 2009. New projects should promote wealth among citizens and not poverty as the case is presently. Estate surveyors should be more creative in their valuation and adopt appropriate methodology so that the project affected persons will not be further impoverished. Value chain associated with ecosystem should be considered when placing value on them for compensation. The practical implication of inadequate compensation is multidimensional which includes impoverishing affected persons, creating unemployment due to non compensation for loss of means of livelihood, and protests by claimants which could lead to destruction and delay in project implementation.

Recommendations

- There is an urgent need to reflect economic realities in the generation of compensation rates for crops and economic losses and structures
- Compensation for natural capital should put into consideration the total economic value of the asset
- Provision for compensation valuation as contained on the green book should be the guide for compensation valuation in Nigeria
- Directors of land in the country should embrace a uniform standard of practice for consistency, uniformity and reliability as provided in the revised Nigerian Green Book of 2023
- There is need for a compensation valuation manual as a guide for compensation valuation.
- There is an urgent need for the establishment of valuer generals office in Nigeria to be responsible for the generation of appropriate compensation rates and advancement of valuation practice in Nigeria.
- Compensation should be an integral part of project procurement.
- There is need to review the provision of the Land Use Act with regard to compensation valuation practice.
- Depreciation should not be applied in compensation valuation as it constrains the ability of the claimant to build a new house or replace lost assets.

Conclusion

The need for compulsory acquisition and its importance in economic development cannot be underestimated. It is a global practice but its implementation varies from country to country. It should not be a weapon for impoverishing citizens. Depreciating the replacement cost is not right as its impossible to replace the building in its present condition. Under the present situation there is undervaluation and impoverishment of project affected persons. The practice of compensation valuation should wear a human face because claimants are citizens whose means of livelihood is being extinguished.

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Macroeconomic Policies and Housing Development in Lagos State, Nigeria

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Abstract

Housing is crucial for national development as a capital product in terms of both economy and welfare. Macroeconomic policies comprise of fiscal policy, monetary policy, and exchange rate policy. These policies affect taxes, tariff, interest rate, inflation rate, employment rate and purchasing power. This study examined the effects of macroeconomic policies on housing development in Lagos State, Nigeria. The macroeconomic factors affecting housing development were incorporated into the questionnaire administered to real estate developers in Lagos State. The methods of analysis adopted were descriptive, correlation and multiple regression. The findings revealed that increase in interest rate, inflation rate, exchange rate and tariff will increase cost of housing development by 10.6%, 8.5%, 13.5% and 16% respectively. In conclusion, the current macroeconomic policies should be reviewed for favourable housing development, national capital formation of employment generation, income production and economic growth in Nigeria.

Keywords: Cost; Development; Housing; Macroeconomics; Policy

Introduction

Housing is one of the basic physiological need of man. Hence, government policies must ensure that housing development is encouraged to meet this basic need. Macroeconomics is a branch of economics that studies how an overall economy in the markets, businesses, consumers and government interact. It also examines economy wide phenomena such as inflation, price levels, rate of economic growth, national income, Gross Domestic Product (GDP) and changes in unemployment. Rapid economic development has resulted in an increasing development and increased rural urban migration which in turns increase the demand for housing among urban areas in Nigeria. Consequently, the high prices of housing in some major cities and towns owing to increase in demand. Hence the need to increase the supply of housing development. The author observed that macroeconomic variables impact on rental and housing prices predominate previous studies (Khalid et al., 2012; Olowofeso & Oyetunji, 2016; Olatunji et al., 2017; Alkali et al., 2020). Whereas the impact on housing development which in turns affect the housing market and prices earns insufficient scientific attention. This study has filled the gap in respect of macroeconomic policies impact on housing development in Nigeria because only one previous study was accessible in the study area. Hence, it is purposeful to conduct the research that would reveal the impact of the macroeconomic factors on housing development in the study area.

Literature Review

Empirical studies on macroeconomic policies and property investment have shown long and short run interrelationship between the two (Nzalu, 2012; Gaspareniene, et al., 2016; Alkali, et al.;

2020). The quality and quantities of a country's housing stock is a measure of the country's economic growth and prosperity. Macroeconomic theories provide policy recommendations intended to improve the performance of the economy and to correct macroeconomics problems. The New Classical economics provided insight into the workings of macro-economy and explains how and why the level of Gross Domestic Product changes with direct implications for unemployment and inflation, interest rate, consumption, expenditures, price level, investment, level of aggregate production, saving and taxes (Ogar, et al., 2019). However, the theory contends that people have rational expectations about consequences of government policies which then negates the impact of the policies. The close connection between politics, policies and macroeconomics means that the development of macroeconomics theories often depends as much as possible on prevailing political attitudes.

Olatunji, et al. (2017) noted that the real estate sector has become a focal point of government fiscal and monetary policies and have been used as yardstick for realising low level inflation, high level of employment, low level of unemployment and balance economic growth. This implies linkage between property development and macroeconomics. The studies on macroeconomic impact on housing prices provide the relevant factors that were adopted in this study therefore, their findings were examined.

Khalid, et al. (2012) reported that macroeconomic variables key indicators were economic output, unemployment, inflation, savings and investment which the stakeholders such as government, business owners and consumers closely monitor. Nzalu (2012) highlighted five common macroeconomics factors as rate of inflation, rate of interest, rate of unemployment, rate of growth in Gross Domestic Product and rate of foreign exchange. Olowofeso and Oyetunji (2016) assessed the impact of selected macroeconomics variables in the determinants of sustainable residential housing prices in Lagos. They adopted semi-log of regression equation model to determine the degree of relationship between the identified dependent and independent variables. The results showed a positive impact of interest rate and exchange rate in determining housing prices. The study concluded that variables such as employment and mortgage interest rate can affect both housing prices and construction of new housing. Gaspareniene, et al. (2016) assessed the impact of macroeconomic factors on housing price level in Lithuanian over a period of 2008 and 2015. The results revealed statistically significant interdependence between aggregate of the major macroeconomics factors and the average annual housing level over the research period. Also, interest rate and availability of bank loans were established as the factors that have the most significant impact on housing prices. Alkali, et al. (2020) examined the effect of macroeconomic variables on housing prices in Abuja, Nigeria from 2000-2007 using correlation analysis. The results concluded that interest rate, consumer price index and exchange rate have the major effects in determining the housing prices in Nigeria. Gaspareniene, et al. (2016) summarised the variables of macroeconomics which have significant impact on housing prices as presented in Table 1 below.

Table 1. Macroeconomic factors that have the impact on housing price level.

Author(s) (year)	Macroeconomic factors
Domingo and Fulleros (2005)	Interest rate, construction price, housing credit policy
Zalieckaitė et al. (2007)	Average wage rate, GDP, inflation rate, availability of bank credits
Hott and Monnin (2008)	Interest rate, GDP (GNI), construction price, consumer purchase power
Lee (2009)	Mortgage rates, interest rates, inflation, population's income changes, construction costs, unemployment rate, equity prices
McCord et al. (2011)	Availability of mortgage, interest rate, income, liberalisation of finance markets
Goddard and Marcum (2012)	Inflation rate, interest rate, environmental pollution, availability of mortgages, currency exchange rate
Pomogajko and Voigtlander (2012)	GDP, convergence of business cycles, availability of credits
Lords LB Baltic Fund (2015)	The state of global and/or regional economics, tax rate, interest rate, availability of funding, inflation (deflation) rate, payment risk
Manganelli, 2014	GDP, interest rate, inflation rate, labour market indicators, tax rate
Oktay et al. (2014)	Inflation, public investment, interest rate, availability of housing loans, GDP (GNI), household income, employment rate
Post and Berkhout (2014)	GDP, employment rate, interest rate, inflation rate, average wage rate
Šečkutė (2014)	Interest rate, GDP, availability of bank credits, credit pay off terms
Ciarlone (2015)	Average wage rate, interest rates, risk-free interest rate, mortgage availability, employment rate, construction costs
Gaspareniene, et al. (2016)	

From the Table 1 above, the macroeconomic variables that affect housing affordability and price level include construction costs, construction price, inflation rate, interest rate, current exchange rate, Gross Domestic Product (GDP), availability of credits, credit pay off terms, average wage rate, mortgage availability, consumer purchasing power and tax rate.

In this study Lagos, Nigeria was chosen for being one of the administrative, political, commercial and high density cities in Nigeria where demand for housing is always on the increase. Also, majority of the Real Estate Developers Association of Nigeria members are located in Lagos. The aim of this study is to examine the impact of selected macroeconomic variables on housing development in Lagos State, Nigeria. The available studies were tailored towards the impact of macroeconomic variables on rental and capital values with one accessible study focusing on housing development. This unsettled gap needs to be bridged in order to give policy makers the basis upon which to formulate and implement policies that will promote housing development in Nigeria.

Methods

The study employed primary and secondary data. The macroeconomic variables were derived from literatures of previous scientific studies related to this study and Central Bank of Nigeria publications. Primary data was gathered through structured questionnaire administered to Real Estate Developers' Association firms in Lagos State. There are 556 firms of registered Real Estate Developers Association of Nigeria (REDAN) in Lagos State (REDAN Directory 2023). Out of the 100 questionnaire distributed which constitute 18% of the population which is the same at 95% confidence level using sample size formula (Kothari, 2014) ninety was retrieved (90%) and admissible for the analysis. A 3-point, a 5-point Likert scales were used to gather responses on macroeconomic variables impact on housing development. In addition the prevailing published interest rate and inflation rate from National Bureau of Statistics (February 2023) were also incorporated into the data analysis. The building cost of three bedroom bungalow (moderately finished) without the cost of the land was provided by housing developers and used as dependent variable for the multiple regression. The admissibility of the building cost was verified by the estimate sourced from independent registered quantity surveyor whose submission was a range from N7.5 million to N9.1 million. The data was analysed using frequency table, percentages, mean, correlation and semi-log multiple regression.

$$\text{Ln Cost} = C + \beta_1a + \beta_2b + \beta_3c + \beta_4d + \varepsilon \quad (1)$$

Where: Ln Cost – Semi Log Cost of Building
 C - Constant
 β_1 to β_4 Coefficients of the Macroeconomic variables
 ε - Error
 a, b, c, d – Microeconomic variables

Findings and Discussion

In this section the data collected for the study was analysed and the results discussed with a view to answering the research question and to achieve the objective of the study. The characteristics of the respondents were presented using descriptive statistics. The effect of the macroeconomics

variables on housing development data was analysed using multiple regression with natural log of the cost of three bedroom bungalow excluding the cost of land acquisition as dependent variable while the macroeconomic variables were independent variables namely interest rate in percentage, favourable interest rate, inflation rate in percentage, inflation rate favourable, tariff favourable, exchange rate favourable, stable labour wage, state of the economy and mortgage availability.

Table 2: Characteristics of the respondent property developers

S/N	Variable	Frequency	Percentage
a.	Experience		
	Less than 5 years	9	10
	5-10 years	48	53.33
	10-15 years	15	16.67
	Over 15 years	18	20
	Total	90	100
b.	Academic Education		
	HND/B.Sc/B.Tech	69	76.67
	MSc./M.Tech	21	23.23
	Total	90	100
c.	Rank		
	Chief Executive Officer	30	33.33
	Managing Partner	30	33.33
	Project Manager	15	16.67
	Technical officer	15	16.67
	Total	90	100

The majority of the respondent property developers were chief executive officers and managing partners while project managers and technical officers were 16.67% each respectively. In respect of years of experience 10% have less than 5 years while 53.33% have 5 to 10 years of experience. The percentage of property developers with 10 to 15 years' experience in practice is 16.67% and 20% have over 15 years post qualification experience. 76.67% have the requisite qualification in the first degree while 23.23% have master's degree. The relevant characteristics of respondents analysed support the fact that the respondent's property developers can be relied upon to provide reliable and useful information on the subject under reference.

Impact of macroeconomic variables on housing development

The respondents were asked to rate their level of agreement and perception with the eight variables of macroeconomics policy impact on housing development using a 5-point Likert scale. The usual variables were revealed in previous similar studies and supported by the results of scientific investigation conducted. The 'strongly agree', 'agree', 'undecided', 'disagree' and 'strongly disagree' rating was analysed to show the impact of macroeconomics variables on housing development. The inflation rate and interest on loan rate in percentages used were from National

Bureau of Statistics, Nigeria. The cost of three-bedroom bungalow excluding land value was also given by the respondents which was found to be within the range provided by an independent registered quantity surveyor.



Table 3: Descriptive Statistics of Macroeconomics Variables

	Mean	Std. Deviation	N
1.Log of cost of a 3- Bedroom Bungalow	6.92186E+00 0	2.552199E- 002	90
2.Tariff Rate favourable	2.90	1.112	90
3.Economy favourable	2.30	.694	90
4.Mortgage Finance Available	2.67	1.171	90
5. Stable Labour wages	2.93	.776	90
6. Interest Rate favourable	2.57	1.181	90
7.Inflation Rate favourable	1.77	.425	90
8.Interest rate in %	3.51	.503	90
9.Inflation rate in %	1.70	.461	90
10.Exchange rate favourable	4.50	.503	90

In Table 3 above, the mean scores of the macroeconomics variables used for the study were presented. The mean scores indicated that the inflation rate is unfavourable as well as the interest rate and the economic situation while the mortgage finance is not readily available. The respondents also confirm selling and letting delay of developed housing which could be attributable to the state of economy. However, they are undecided in respect of tariff rate as well as whether labour wages are stable.

Cronbach's Alpha of reliability of the variables for the multiple regression analysed was .603. The relationship between the variables are majorly low and medium positive correlation except the relationship between favourable interest rate and mortgage finance availability as well as no letting delay and favourable economy that was very low negative correlation. The independent variables were not highly correlated with less than .700 except for interest rate in percentage and exchange rate of .978 hence, interest rate in percentage was excluded from the regression. Others were appropriate for the regression analysis. Multiple regression was used with a natural log of cost of building (LnCost) as dependent variable. The cost of land was excluded due to high degree of disparity of land value in Lagos State. Besides there is a direct relationship between the cost of

building and chosen variables. The application of a regression log from previous studies is adjudged credible in determining the percentage impact of macroeconomic policies on housing development as in Eshet, et al., (2007).

Table 4: Coefficients^a of the multiple regression

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t			Zero order	Partial	Part	Tolerance	VIF
1 (Constant)	6.908	.044		157.608	.000						
Interest Rate Fav.	.002	.003	.106	.777	.440	.006	.086	.081	.585	1.710	
Inflation rate in %	-.007	.008	-.127	-.901	.370	-.203	-.100	.094	.545	1.835	
Inflation Rate Fav.	.005	.008	.085	.661	.511	.108	.073	.069	.663	1.509	
Tariff Rate	.004	.003	.160	1.114	.268	.124	.123	.116	.526	1.899	
Labour wages	-.001	.004	-.032	-.262	.794	-.031	-.029	.027	.734	1.362	
Exchange rate Fav.	.007	.007	.135	.945	.347	.230	.104	.098	.535	1.871	
Economy Fav.	-.008	.004	-.227	-1.907	.060	-.141	-.207	.199	.769	1.301	
Mortgage Finance Ava.	-.003	.003	-.133	-.967	.337	-.011	-.107	.101	.577	1.734	

a. Dependent Variable: Log of Cost of Building 3 Bedroom Bungalow

Furthermore, the coefficients and residual statistics show that Tolerance is less than 1 and the variance inflation factor (VIF) is less than 2. The regression equation correlations for interest rate, inflation rate, tariff rate and exchange rate variables (zero order, partial and part) are positive and Mahalanobis (MAH) distance revealed no outlier. MAH distance values were less than the critical value of 26.13 for 8 independent variables and Cook's distance values for each case less than 1. Therefore, the data are reliable as there is no violation of multi-collinearity assumptions.

$$\text{LnCOST} = 6,908 + .106 \text{ INTEREST} - .127 \text{ INFALTION\%} + .085 \text{ INFLATION}$$

$$+ .160 \text{ TARIFF} - .032 \text{ LABOUR} + .135 \text{ EXCHANGE} - .227 \text{ ECONOMY} \\ - .133 \text{ MORTGAGE} + 2.506263\text{E-}002 \quad (2)$$

The R is .365 while R square is .133, thus implying that the independent variables explain cost of housing development in Lagos State by about 13%. This implies that are other relevant variables that were not captured in this study. This is a gap for further study. The regression model (2) reveals that increase in interest rate, inflation rate, exchange rate and tariff will increase cost of housing development by 10.6%, 8.5%, 13.5% and 16% respectively. The results confirmed Olowofeso and Oyetunji (2016) study that observed that macroeconomics variables have impact on cost of construction. The Analysis of Variance (ANOVA) in Table 5 indicates that the independent variables adopted in the regression analysis do not have significant effect on the dependent variable that is Cost of housing development (Sig. =.213).

Table 6: ANOVA^a for multiple regression of respondents

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.007	8	.001	1.390	.213 ^b
	Residual	.051	81	.001		
	Total	.058	89			

a. Dependent Variable: Log of Cost of Building 3 Bedroom Bungalow

b. Predictors: (Constant), Mortgage Finance Available, Exchange rate, Economy Favourable, Labour wages , Inflation Rate Favourable, Interest Rate Favourable, Inflation rate in %, Tariff Rate Favourable

Conclusion

This study has established that fluctuation in macroeconomic variables lead to corresponding change in the cost of the housing development. Therefore, there is need for the government through the relevant agencies such as Central Bank of Nigeria to work with financial institutions so as to review their lending rates to accommodating rate and proffer favourable macroeconomic variables such as exchange rate and control inflation rate to promote investment in the economy. Having established the fact that macroeconomic indicators have effect on the property development cost using regression model, there is a need for Nigerian Estate Surveyors and Valuers to acquaint themselves with the use of the model where macroeconomic variables are incorporated into land appraisal for a well robust market analysis and appropriate advice on property investment decision.

Note on Contributor

Titilayo A. Ukabam holds Bachelor and Master of Science in Estate Management from Obafemi Awolowo University, Ile-Ife, as well as a Master of Science in Construction Management and Ph.D in Estate Management from the University of Lagos, Lagos. A member of the Nigerian

Institution of Estate Surveyors and Valuers. Her research interests include land economics, valuation of contaminated property and land governance.

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**Peer Reviewed*

The tragedy of anticommons and associated challenges with management of Commercial Properties in Ghana

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Abstract

The tragedy of anticommons is a property-owning structure where multiple owners hold the right to exclusion of a particular asset or resource; in effect when there exist too many decision makers (multiple co-owners/ landlords) in one property, it generally leads to underutilization and reduced revenues that might accrue in rent payments. For the asset to be optimally used, permission must be secured from all co-owners. Since, each owner has the right of exclusion; in effect any owner can veto the use of the asset. The problems inherent with anticommons presents itself in different ways which can create management challenges for a property manager. The different perception and appreciation of the multiple landlords about property management coupled with the intended economic profit they individually want to realize from their interest in the property can create conflicts in how they each believe the property should be managed to optimize profit. It can further compound the problems faced in the administration of professional management duties. This research uses a case study of a commercial property with multiple landlords (co-owners) in the Central Business District of Kumasi-Ghana. Analysis of data gathered by structured questionnaires for tenants and interviews with the property manager and landlords were used. The study revealed that problems faced by property managers included micromanagement by some of the landlords, poor or no scheduled maintenance practices and low level of professionalism by property manager. It is recommended that service and administrative charge should be discussed and agreed prior to the start of tenancy to eliminate misunderstanding between parties and promote payment to contribute to routine maintenance costs. It concludes that a property manager should be skillful in meeting specific investment objectives of co-owners to ensure that the property accrues optimal returns.

Keywords: Anticommons; Multiple Co-ownership; Commercial Property Management; Ghana

1 Introduction

Property management is essential to ensure value for money over the life-cycle of the estate. This includes to negotiate lettings, rent reviews and lease renewals, oversee physical maintenance, enforce lease covenants, assess the necessity of upgrading and merging interests, recognize opportunities for the development of potential, and to fulfill owner's legal and social duties to the community (Oyedele, 2013; Cheng, 1998; Naz et al., 2022). Property management to a non-professional only entails rent collection, maintenance activities and janitorial services but it goes beyond that and involves a variety of activities to be performed by the property manager in order to reach the ultimate aim of adding on to or maintaining property value (Nwaogu et al., 2022; Owusu-Acheaw, 2011).

Commercial property may have multiple tenants as well as multiple owners. In the case of properties held in multiple-ownership the co-ownership rights are structured as a system of tenants-in-common, whereby each co-owner holds undivided shares in the whole. Hence, there is no

separate ownership of the property, but rather each co-owner has the right to possession of land and buildings in common with all other co-owners (Kent et al., 2002).

2. Nuances of multiple ownership of commercial properties

Managing properties that have multiple co-owners/co-landlords has its own challenges. To optimize the value of the asset requires owners to agree on several management decisions which in many cases is difficult to achieve (Hastings et al., 2006). Walters and Hastings (1998) assert that managing multi-landlord properties presents three unique challenges – illegal alteration and use of property; agreement on minimum standards of maintenance to be carried out; and redevelopment problems.

The institutional arrangement for properties that have multiple co-ownership often results in a system where an individual co-owner can veto an action in relation to the management of the property leading in most cases to under usage (Buchanan & Yong, 2000). In essence, this co-ownership structure can preclude others during the decision-making process. In order to optimize the use of the asset, all co-owners must be in agreement before any decision on maintenance, management, or redevelopment of the property can take place. If one owner does not wish to participate in a particular decision-making process the others going ahead to take the decision will cause disagreements.

This common feature of joint co-ownership is grounded in the theory of collective governance that has its pertinent challenges. Since no co-owner/ landlord has the right of exclusion, the strategy would be to use the property as optimally as possible to obtain expected returns. Heller (1998) in defining the tragedy of the “anticommons” posit within a property-owning structure where multiple owners hold the right to exclusion of a particular asset or resource, the resource may be wasted if co-owners fail to agree on a use. In effect when there exist too many decision makers (multiple co-owners/ landlords) in one property, it generally leads to underutilization and reduced revenues that might accrue in rent payments.

This phenomenon, although unique in many developing countries, is not reported in the extant literature. Hence, the study aims to examine challenges posed by the tragedy of the anti-commons in the management of commercial properties and to identify which management solutions can help mitigate the challenges identified. The next section provides some context into understanding the nature and characteristics of multiple ownership of commercial properties within a developing country’s context.

3 Research Methodology

The study draws heavily on on-site observations and reports across the sub-region. It proceeds to utilize secondary data to advance the appreciation of issues to be discussed. Data for the study was derived from both primary and secondary sources – peer reviewed journal articles and periodicals. The primary data was gathered during field survey from respondents of the study. The survey data was gathered from tenants, landlords and the property manager using a case study approach. The case study approach is useful in obtaining in-depth appreciation of a phenomenon of interest in its natural real-life context and also allows for specific questions to be answered using evidence from multiple sources of the same unit (Creswell & Plano Clark, 2007; Yin, 2003). A

descriptive research design was used to scrutinize the views of the respondents in relation to sequence of events and their justification. Both qualitative and quantitative approaches were used to support the existing literature in the study and the relevant contribution they make in unveiling profound information from respondents in their own language and environment. Thematic content analysis is used to analyse relevant secondary data.

At the time of the field study, 2 office spaces were vacant, and 3 tenants declined to be part of the survey hence 31 out of 36 tenants responded to the questionnaires, representing a response rate of 86%. 14 of the spaces in the building accommodate stores for general goods and merchandise, 7 spaces accommodate warehouses and the remaining 15 spaces accommodate offices (see figure 1).

The sample for this study was 35 respondents comprising 31 tenants in occupation, 3 landlords and 1 property manager of the multi-landlord commercial property.

Table 1. Sample Presentation of respondents

Type of Respondent	Quantity	Percentage
Co-Landlords	3	8.57%
Tenants	31	2.86%
Property Manager	1	88.75%

Source: Field Survey, February 2022

4 Case study: Commercial Property with Multi-Ownership in Kumasi

The case study is a commercial property in Adum, the Central Business District of Kumasi-Ghana. The property has three co-owners with the right to survivorship. They have rights of exclusion over the property. The property manager must secure permission from all three owners to implement a decision. Since each owner has the right of exclusion, any owner can veto the decisions of the property manager. This in essence leads to delays in agreeing to decisions that hinge on improving the property.

This phenomenon, although unique in many developing countries, is not reported in the extant literature. Multiple owners/landlords arise because of inheritance of property among several surviving children of a deceased principal owner, and this often poses some management challenges. Peculiar features that characterize these types of commercial property are that they are mostly not registered (do not have good title), might not have a common property manager, landlords are not usually in agreement on how rents are to be fixed, some landlords make capital investments in the property on the blind side of other co-landlords, certain management decisions take longer to make due to disagreements among multiple owners.

to securing the services of a professional property manager (and a team) and issues they would have to deal with on a regular basis. Commercial properties such as office blocks and shops present the greatest management challenge to the property manager especially in developing countries (Nwaogu et al., 2022). The responses gathered are presented using thematic content analysis (TCA). The next sections will discuss some common management challenges faced by property managers in the management of multi-tenanted commercial properties with multi co-owners/landlord.

5.1 Micromanagement of the property by some landlords

The choice of in-house or outsourcing of management functions to a property manager, usually results in protracted disagreements – as a result some maintenance issues are left unattended to for a long time which can frustrate the effective performance of a property manager's duties.

Information gathered from the Landlords and confirmed by the property manager was that two of the Co-Landlords lived in different regions of the country from the property location, but one lived in the same region and operated his business from one of the stores in the subject property. The problem of micromanagement is prevalent especially when one of the landlords also happen to occupy a space within the commercial property. Most private landlords tend to manage their properties themselves and often interfere with professional management if such services are in place. In the case study, information gathered from the property manager indicates that the landlords interfere with the management, repair and maintenance decisions of the property manager from time to time. There had been interference on three different occasions by two of the Co-landlords.

When a proposed budget for corrective maintenance was sent to the landlords for approval, the maintenance works had been outsourced by one of the landlords to artisans at cheaper cost on the blind side of other co-landlords and the property manager. This often results in re-occurrence of the repair issues since there was no supervision to ensure proper and professional workmanship.

In another situation, one of the landlords had engaged the services of an accounting firm operating in one of the offices in the property for taxation purposes instead of the accounting firm recommended by the property manager before informing the property manager and other landlords for consent.

In the third instance, one of the Co-landlords had engaged the services of a debt-recovery company for recovery of rent arrears due him because they did not want to go through the judicial route.

5.2 Default in rent payment

In many cases, some landlords are of the opinion that delay in rent payment is as a result of the non-proactiveness on the part of the property manager and the opinion of the three landlords were no different.

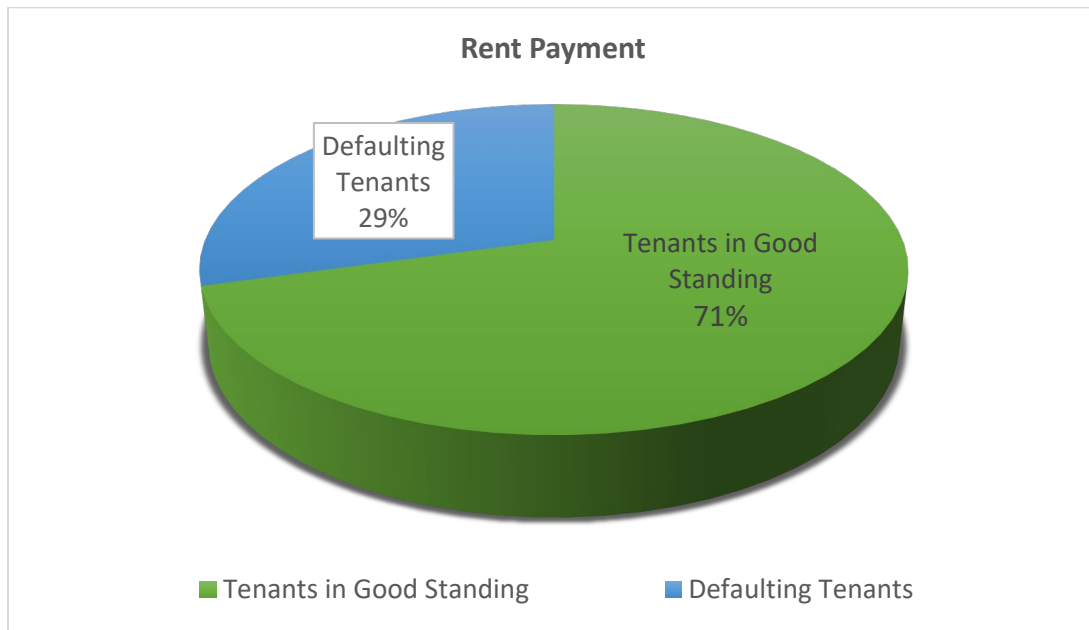
Information received from the property manager indicates that out of 34 tenants who occupy the property, ten (10) had rent arrears and were defaulting in payment of rent as of February 2022 (figure 2); even though the rent is supposed to be paid in advance at the end of each lease

period. This was the case after rent demand notices had been issued at the beginning of the previous year and default reminders also served.

Information gathered from tenants also indicated that some of the landlords use the professional services of some tenants in the property but do not fully pay the agreed professional fee for such services, hence the deliberate default in payment of rent to the tune of the amount involved. With this scenario, the property manager is left with the herculean task of safeguarding owners' investment, protecting tenants' rights and ensuring that they are fully shielded from problems arising from stakeholders in the management portfolio (Dabara et al., 2012).

Another key reason for default is making wrong choices in tenant selection. Managing difficult tenants puts undue pressure on the property manager and management effectiveness. In developing countries data on tenants' profile and financial history is non-existent. In order to reduce high vacancy, rate the property managers have to rely on information provided by tenants themselves to make a decision. This was the case in the selected property hence poor tenant choice was being blamed on the property manager by two of the landlords.

Figure 2: Rent payment



Source: Field Survey, February 2022

5.3 Litigation and Court Representation of Landlord

Commercial property management can be highly litigious especially when there are disagreements with management on legal issues (Akogun, 2015). The basis of disagreement being mostly rent default, rent increments, maintenance issues, property conversion to other uses, illegal transfer of occupation rights (unauthorized sublets) and disturbance from other co-tenants. Disagreements may involve co-landlords, the property owner/landlord and adjoining landowners, landlord and tenants, among co-tenants, property manager and co-landlords, property manager and

co-tenants, between co-tenants and adjoining landowners/ users, landlord/ co-landlords and statutory authorities, among others. In practice, property management services include representing the landlords before courts of competent jurisdiction and the process of writing statutory notices to attending court proceedings is not only time consuming but involves, monetary and non-pecuniary costs (Dabara et al., 2012). With multiple landlords the property manager may be faced with representing more than one landlord in multiple court case concurrently.

The property manager had represented multiple landlords in three litigation cases against co-tenants in court and a conflict about rent review at the Rent Control Authority. This can be time consuming and ultimately contributes to low productivity because the resources could be spent on other productive professional management assignments.

5.4 Poor Maintenance culture due to unavailability of funds

The objective of commercial property maintenance is to ensure that buildings retain their structural, functional and aesthetic conditions throughout their lifecycle and reduce unnecessary expenditure through factors such as building age, expectation of tenants, failure to execute maintenance at the right time, maintenance factors, political, outstanding maintenance charges, over budgeting and other factors that contribute immensely to high cost of maintenance (Ali et al., 2010; Uzoamaka & Emoh, 2018). The basic maintenance strategies include preventive, corrective and condition-based Maintenance. The practice of planned and periodic corrective and preventive maintenance should be adopted by professional property managers to ensure adequate preservation of the building and its elements to enhance its values (Nwaogu et al., 2022).

In the case study, information from the property manager indicated that proposed maintenance schedules were not adhered to or followed. The tenants also complained that routine maintenance activities were not done on time or simply not done at all. It must be noted that tenants do not pay any service charge as such no money is available when maintenance of the property needs to be carried out. In many cases, these maintenance activities are done at the discretion of the property manager. Disagreements by co-landlords on whether maintenance activity is critical or not normally leads to unnecessary delay of works. Property manager has to convince co-landlords that such works are critical for them allocate part of the rent to carry out maintenance activities.

5.5 Professionalism of property managers

The property manager has a dual responsibility: to the owners or landlords who are interested in the highest return from the property; and to the tenants, who are interested in the value-for-money, including reasonable safety measures and compliance with fair housing laws (Oladokun & Ojo, 2012). In addition to being aware of pending or enacted changes in the zoning ordinance that might affect the market value or use of property being managed, the manager should be informed about laws, proposed legislation, government regulations, public policies and current market conditions (*ibid*).

In the case study, the co-landlords claim that various statutory payments such as rent tax, ground rent and property rates were not paid over a six-year period because the previous property manager had not prompted the landlords to make funds available for the payments. Subsequently payments were made with penalty for the years in default. This according to co-landlords

amounted to professional negligence on the side of the property manager. Information gathered suggests that co-landlords are not prepared to make such payments, because these are not factored into rents that are agreed upon a new tenancy. As such they consider any extra statutory payments as a reduction in revenues due them and will not part with any extra amounts. Anecdotal evidence suggests that the bills for various statutory payments are usually sent to owners/ landlords for payment but due to no levy of service charge, they refuse to pay and incur any extra expenditure.

Advising on adequate insurance policy for the property, reviewing the sum insured at required intervals and ensuring that the premiums are paid regularly are also part of the duties of the property manager (Akogun, 2015). Information gathered from the landlords indicates that the property had not been insured and about 25.8% of tenants had insured their businesses against fire, burglary, and allied perils. Insurance seems to be a contentious issue as many owners and tenants will not take an insurance policy because they consider insured events not plausible/ occurring, that the periodic premiums are too expensive or that when an insured event occurs insurance companies are not prompt in making payments or refuse to make payments altogether. Past bitter experiences deter people from taking out an insurance policy. Insurance companies are aware of this apathy and are regularly providing new and innovative services to increase their market share and encourage people to take out a necessary policy. It must be noted that for commercial properties where the probability of an insured event occurring is high, insurance companies either exact exorbitant premiums or do not provide insurance at all – leaving landlords or tenants to their fate.

This section provided some challenges encountered in the management of multi-landlord/ multi-tenant commercial properties. These challenges can be generalized across several countries within Sub-Saharan Africa with similar market characteristics like Ghana. The next section provides the key findings as well as recommendations.

6 Conclusion

The study revealed that in relation to the case study, the tragedy of anticommons pose peculiar property management challenges including micromanagement by co-landlords; non-adherence to maintenance Schedule; Litigation and court representation; Rent defaults; and Professionalism of property manager. Based on the findings authors recommend the following:

Disputes can be amicably settled when parties agree to ADR mechanisms or an out of court settlement. This should be used as a first option to avoid prolonged court litigation and court proceedings.

In tenant selection, the property manager should perform due diligence on potential tenants to avoid letting out property to difficult tenants. Probing into the source of income for initial rent advance as well as the possibility of tenant's business flourishing should be factored into the decision-making process. Property managers should keep updated records and send out timely reminders to tenants to minimize defaults.

Preventive Maintenance schedule activities, service and administrative charge should be discussed and agreed with co-landlords and tenants to promote payment and elimination of misunderstanding between parties and ultimately ensure success. In order to ensure availability of

funds for maintenance activities the property manager should plan ahead and factor all possible maintenance costs based on experience of previous years' expenditures.

To reduce interference by the co-landlords and possible micro-management, the property manager's contract should clearly outline the scope of management activities to be carried out. Also, property manager should periodically update and report to co-landlords on the management activities carried out. Transparency and honesty should be a manager's natural skill to gain the trust of co-landlords. This could potentially win over other co-owners/landlords who might not agree to appointing a property manager.

The property manager should be a member of a professional body and make a conscious effort to be abreast of international and local best practices that are associated with the profession. Attendance of regular Continuous Professional Development (CPD) activities and programmes should be a must if effective management must be ensured.

For future research, authors suggest a number of case studies in other similar markets like Ghana to confirm findings as presented in this research.

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No potential conflict of interest was reported by the authors.

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NON-PEER REVIEW PAPERS

**Non-Peer Reviewed*

An Assessment of Challenges and Prospect of Real Estate Development in Nigeria

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Abstract

The focus of this study is to analyze the problems that are related with genuine property development finance in Nigeria. The study endeavors to investigate the different wellsprings of finance that are accessible for genuine property development with the end goal of deciding the problems that hamper successful progression of asset. To accomplish this, some estate reviewing and valuation firms in Abuja that participate in genuine property development, a few financial foundations that store property development and a few designers were inspected using polls to recognize a portion of the problems that defy land development with regards to fundings. Straightforward enlightening factual strategies were utilized for the examination and show of the information. The study shows plainly those problems going from exorbitant loan costs to that of the various necessities from candidates for loan, which by and large they see as challenging to meet, bothered the supporting of genuine properties in Nigeria. Furthermore, the inflationary rate in the nation additionally adds to the problems of supporting genuine property development in Nigeria. It suggested among others that the Nigerian government ought to attempt to take care of its monetary problems, for example, expansion to limit the problems that plague the funding of land development.

Keywords: Real Property, Finance Development, Problems, Inflation

Introduction

Appropriate funding means quite a bit to effective property venture and development. Different types of finance based on fluctuating conditions from assorted financial planning organizations are accessible to the property market. The chief field where different types of speculation finance are utilized is that of development where each loan must be exceptionally custom-made for a singular plan and the specific stages inside the plan.

Since property development specifically includes immense capital consumption, finance is in this way a fundamental information, the idea of which is to give cash-flow to empower the venture work financially. The expense and accessibility of finance for land development can impact the suitability of such task.

Despite the significance of development finance in property development, there is deficiency of data on how much subsidizing that happens, by whom, or the technique utilized. However this isn't startling given the overall qualities of development financing: there is no focal office or foundation to co-ordinate the matter of property subsidizing.

In the order of man's requirements, lodging has been positioned second and thus; lodging arrangement has turned into a foremost foundation of the strategies of different legislatures both at government and state levels since freedom in Nigeria. The outcomes of the fast pace of

urbanization are most apparent in the quick decay of metropolitan lodging bringing about metropolitan lodging neediness particularly as there is no proportionate expansion in the quantity of lodging stocks.

The house possesses an exceptionally extraordinary situation in the existence of every single person and stands apart as one of the fundamental necessities of people after food as there is the natural craving of each and every man to claim a fair house. It is the most single non-business speculation or buyer of pay. For most working Nigerians, the procuring limit is by and large low and makes it for all intents and purposes incomprehensible for the typical Nigerian to save towards possessing a house. Likewise, the waning financial fortunes in Nigeria which diminishes the limit of people to possess a house.

The financial expansion times of the 1970s additionally added to the lodging problems in Nigeria. During this period, there was surplus capital, the financial environment then, at that point, was great for the development of land and the possibility of gain was over blown as were the pace of development. The oil blast got a period of metropolitan development, which was past all assumption and subsequently prompted a gigantic flood in property development. Financial houses promptly obliged engineers' loans, as they saw least dangers.

Be that as it may, with the accident in oil costs in the mid 1980s, the economy was tossed into emergencies and downturn accordingly set in which severely impacted the land area. Since land development requires immense capital cost, there is generally the requirement for land engineer to hotspot for store. This capital is normally higher than the value capital of such a designer and the main way out of this dilemma is to hotspot for found through different means separated from his own reserve funds.

Which different wellsprings of finance separated from value capital are accessible to the land engineer? What problems are being experienced in helping finances through these different sources? These and different problems are what the study attempts to settle.

Concept of Real Estate/Property

Property indicates land or steady as it is at times called and different articles known as belongings or movables (Megarry, 1982). Legitimately, these are known as real property and individual property separately. Property is the selective right to ownership, happiness and demeanor of anything which can be the topic of possession; and it likewise incorporates the restrictive right to what's to come advantages of a financial decent, be it material or non, not entirely set in stone by regulation. The above freedoms comprise a heap of privileges (Denman, 1968). Real property alludes to the interests, benefits and innate squarely in the responsibility for actual land (real estate).

However, with the end goal of this study real property implies land and structures, which are sorted into various kinds as indicated by the different purposes to which they are being put and for which they are planned. These incorporate private, business, modern, farming, sporting properties and so on

Concept of Development

Development is the most common way of doing works including an adjustment of the actual use or in the power of a current utilization of land or structures (Balchin et al., 1988).

The term 'development' as characterized in segment 2(1) of the Nigerian Town and Nation Arranging mandate 1948, states that "development corresponding to any land incorporates any structure or reconstructing activity and any utilization of land or any structure consequently for a specific reason which is not quite the same as the reason for which the land or building was formerly being utilized".

In his own view, Lichfield (1956) brought up that among the Modelers, Organizers, Specialists and Assessors, the word development by and large signifies "the most common way of doing development including an adjustment of the power of the utilization of land or with a re-foundation going from the unassuming expansion of a room or a carport to a confidential house or the aggressive re-development of a downtown area".

Development can likewise be viewed as the use of capital, work, administrative expertise and ability to pioneer to land assets to work on its useful limit.

Types of property development incorporate private, business, modern and office properties. The development of a specific real estate parcel is a cycle, which includes much than the simple doing of constructional works. It begins previously, maybe numerous prior years, works and structures are planned; and endures, maybe past when the new works are finished, until the new convenience is completely involved and utilized.

Development by and large means the most common way of completing the constructional works, which are related with an adjustment of the utilization of land or of land with its structures, or with an adjustment of the force of the utilization of land, or with a re-foundation of a current use.

Real Estate Finance

Real estate finance can be checked out, as need might have arisen to Cary out real estate development and other related activities. It is a fundamental fixing in advanced real estate development and most huge scope development wouldn't take their current scale without significant credit. The lodging finance framework in Nigeria isn't suitable and this makes preparation of finance and credit for lodging development troublesome.

Finance is a basic focal point in any real estate development; the capacity of an engineer to prepare an adequate number of assets for the venture decides to a great extent, the outcome of the undertaking. Finance is an exceedingly significant component, a sine-quantum and exceptionally vital fixings to projects, regardless of their inclination. It is fundamentally the support, which supports the switch for development projects.

The exhibition of any lodging finance framework will rely fundamentally upon the volume and nature of assets inside the economy and the extent of it that can be spread, activated or even committed for lodging. Real estate finance can be seen as the acquiring of cash to do real estate development.

Sources of Real Estate Finance in Nigeria

As the need might have arisen for real estate development, designers generally hotspot for reserve to supplement their value capital. Enormous engineers will typically have various subsidizing game plans with different monetary offices. In any case, the field is turning out to be so mind boggling and serious that successful venture the executives is progressively worried about the manner by which command over a specific plan will be impacted by the beginning and nature of development finance. There are different sources through which the designer can get asset to finance real estate development.

1. Equity Capital

This is the asset realized from individual reserve funds and family reserve funds. It is typically low on account of low per capita pay, inconsistent dispersion of pay and high populace in every nuclear family bringing about exorbitant utilization, low reserve funds and low interest in Nigeria.

Since this value capital is typically little, it is judicious for him to settle on a combination of value and obligation capital which will guarantee the most elevated expected return as well as not hinder the suitability of the development. A designer's capacity to get will be improved by the size of value capital available to him.

2. Direct Loans

These are the loans got directly from the various lenders such as banks and other financial institutions for a specific period. They are classified according to their duration, short, medium and long terms.

(a) Short Term Loans: The ordinary strategy for raising assets for the securing of land and the resulting development of potential speculation property more than a long term period is via transient finance. The conventional wellsprings of transient finance are the business and shipper banks as well as finance houses. The terms on which these loans are given are typically exceptionally rigid and the interests charged are normally on factor revenue premise and 2 percent to 6 percent above essential rate.

Before, joint stock or clearing banks have additionally been associated with this sort of loan.

One benefit of loans in business banks is that a significant extent will in general develop, inside 1-5 years. Most times, the types of guarantee security requested by the banks are not exactly agreeable and planned borrowers are deflected by these somewhat unyielding requests. Shipper banks also have a similar development design as business banks however are considerably more worried about liquidity.

With an end goal to prepare assets into private lodging area, business and vendor banks were coordinated by the national bank of Nigeria to regard the private area as a favored area and designate something like 7% of their loanable assets into the area. The rules additionally specified that where the absolute lodging loans allowed by the banks at whatever year is lower than the level

endorsed by the national bank, the deficit will be taken from the banks and on-loan through the national bank to the government contract bank. Loans for private structure development were for a base time of 15 years. Be that as it may, these rules have not been completely consented to as the banks are organized to oblige easily transient loaning. Property organizations likewise give momentary loans to designers.

(b) Medium Term Loans: These are loans granted for periods not exceeding 10 years. They are normally obtained by direct loan or overdraft from the commercial banks. Such loans are frequently raised while arrangements are being made for long-term loans. The banks are free to lend to whom they choose. Loans are repaid in a lump sum or by arrangement, and are subject to recall by the bank at any time.

Long Term Financing: Long-term development finance as its name implies is finance that is redeemable within 20 to 30 years or even more and usually at a relatively lower rate of interest. The greater equity participation providers in Nigeria are the federal mortgage Bank of Nigeria, various states' property Development Corporation and Insurance and Assurance Companies etc. Their lending activities are concentrated mainly in the residential housing sector.

Long-term development finance has traditionally been raised either by mortgage or particularly in terms of credit squeeze by sale and leaseback. Another aspect of long term financing is the forward sale, which is normally provided by the insurance companies and pension funds. These companies tend to exercise extremely tight control over the entire project, including land acquisition, design, construction and sale or letting of the project.

Empirical Review

In another study carried by Abdullahi & Issa (2018) Access to land and the Delivery of Affordable Housing in Nigeria: An Assessment of the Federal Housing Authority (FHA) in Abuja. The main objective of the study was to examine the extent to which access to land influences the ability of the Federal Housing Authority (FHA) in the delivery of affordable housing to the middle and low-income earners in Nigeria with a specific focus on the Federal Capital Territory (FCT), Abuja. The study adopted survey approach with questionnaire and unstructured interview as major instruments of data collection. The study selected a sample size of 150 out of staff population of 430 which represents 34.9% of the study population. In analyzing the data, the study employed simple percentage, and arithmetic mean with the aid of the Statistical Package for the Social Sciences. The hypothesis of the study was tested with Pearson's chi-square method. The findings of the study revealed that there is no significant difference among the staff of FHA in their perception of difficulty in access to land as a major challenge to the delivery of affordable housing in Abuja.

Theoretical Framework

Abraham Maslow's Hierarchy of Needs Theory was proposed by Abraham Maslow, an American psychologist, in 1943.

Abraham Maslow's theory, known as Maslow's Hierarchy of Needs, proposes a hierarchical model of human needs and motivations. Maslow suggested that individuals have a set of needs that drive their behavior, and these needs are organized in a hierarchical manner.

The hierarchy consists of five levels, often depicted as a pyramid, with the most basic needs at the bottom and higher-level needs at the top. The five levels of Maslow's Hierarchy of Needs, from bottom to top, are as follows:

Physiological Needs: This level encompasses the most fundamental biological needs required for survival, such as air, water, food, shelter, sleep, and sexual reproduction.

Safety Needs: After physiological needs are satisfied, individuals seek safety and security. This includes personal and financial security, stability, protection from physical harm, and a sense of order and predictability.

Love and Belonging Needs: Once the lower-level needs are fulfilled, individuals have a need for social connection, love, and a sense of belonging. This involves forming relationships, experiencing intimacy, and being part of a supportive community or family.

Esteem Needs: After satisfying the need for belonging, individuals strive for self-esteem and recognition. This includes developing self-confidence, achieving personal goals, gaining respect from others, and receiving acknowledgment for one's accomplishments.

Self-Actualization Needs: The highest level in the hierarchy is self-actualization, which represents the desire for personal growth, self-fulfillment, and reaching one's full potential. This involves pursuing meaningful activities, embracing creativity, seeking personal development, and engaging in activities that align with one's values and passions.

According to Maslow, individuals progress through these levels in a sequential manner, with the lower-level needs taking priority until they are sufficiently satisfied. Only when lower-level needs are met can individuals focus on fulfilling higher-level needs.

Maslow's theory has been widely applied in various fields, including psychology, education, management, and marketing, to understand human motivation, well-being, and the factors that drive behavior. It highlights the importance of addressing basic needs before individuals can strive for personal growth and self-actualization.

Proponents of the theory

Abraham Maslow is the primary proponent of Maslow's Hierarchy of Needs theory. He developed and introduced the theory in his 1943 paper titled "A Theory of Human Motivation." Maslow was an influential figure in the field of psychology and made significant contributions to the understanding of human motivation and behavior.

Methodology of Study

This study requires data on the problems that are being experienced in assembling assets for real estate development in Nigeria. To get this data, the organizations and people that are associated with the activation of assets for real estate development should be reached.

Likewise, some rehearsing firms of estate reviewing and valuation in Abuja that include in real estate development and some confidential real estate designers which adding up to 54 in number were all analyzed using polls to get data on reserves assembly for real property development. Likewise, authorities of a portion of these monetary establishments were likewise reached to evoke more data on this subsidizing.

The information accumulated were examined and introduced utilizing straightforward spellbinding measurable strategies.

Data Analysis and Discussion

The information gotten from the organization of polls on some rehearsing estate reviewing and valuation firms that participate in real estate development and a few confidential designers in Abuja along with the meeting led with the authorities of a portion of the monetary establishments structure the foundations of this examination.

Table 1: Sources of finance for real estate development

Source	Frequency	Percentage
Internal funds	22	40.7
Funds from private Investment	1	1.9
Commercial Banks	14	25.9
Merchant Banks	5	9.2
Mortgage bank	10	18.5%
Insurance and Pension Funds	1	1.9
Government Bonds	1	1.9
Total	54	100

Source: Field Survey, 2023

Table 1 shows the different wellsprings of finance that the real estate engineers use in Nigeria. Inside created reserve in any case alluded to, as value capital takes as high as 40.7 percent of the complete respondents. This shows that greater part of the real estate engineers depend more on their value capital than some other source. 25.9 percent of the respondents determine their real estate finance from business banks while 9.2 percent get their finance from dealer banks. Contract banks take as high as 18.5 percent of the absolute respondents, with insurance agency and benefits subsidizes taking 1.9 percent and Government bonds representing 1.9 percent too. The table 2 shows obviously that the majority of the engineers focus erring on their inside produced income than different sources somewhat due to the problems they experience trying to use different sources and furthermore the exorbitant financing cost that these different sources are related with.

Table 2: Problems encountered in securing development finance from the financial institutions

Type of Problem	Frequency	Percentage
Excessive protocol and bureaucracy	17	31.5
Collateral Security	6	11.1
Restriction of government policies	5	9.2
High Interest rate	17	31.5
Loan ceiling and duration	9	16.7
Total	54	100

Source: Field Survey, 2023

Table 2 shows the plenty of problems that real estate engineers face in attempting to set up for development finance from different sources separated from value finance (individual reserve funds). Exorbitant loan fee along with the related extreme convention and organization are the problems that are seriously disturbing in the journey for development finance. They represent 31.5 percent each out of the absolute problems. Different problems that were found incorporate loan roof and span, government arrangements and guarantee security taking 16.7 percent, 9.2 percent and 11.1 percent, individually.

Table 3: Ranking the various requirements for loan in the various financial institutions

Condition	Frequency	Percentage
Certificate of occupancy	39	72.2
Approved Building plan	35	64.8
Survey plan	23	42.6
Bill of Quantities	22	40.7
Feasibility and viability report	17	31.5
Evidence of past performance	13	24.1
EIA	9	16.7
Tax clearance	9	16.7
Development Levy receipt	6	11.1

Source: Field survey, 2023.

Table 3 shows the different prerequisites as requested by the different monetary establishments for giving loans. Out of this multitude of prerequisites, declaration of inhabitation positions most noteworthy taking 72.2 percent, which shows that practically every one of the monetary foundations require it as a condition for loan payment. This is firmly trailed by supported building plan as a condition for giving loans to engineers, it takes 64.8 percent. Overview plan and bill of amounts take 42.6 percent and 40.7 percent separately. The possibility and suitability report of the proposed development and proof of past execution of the designer are additionally required taking 31.5 percent and 24.1 percent separately. The problem exuding from this past exhibition is with new designers who don't have this record meaning they won't be conceded loans. A few monetary establishments demand for development demand receipt from the state as a condition for giving loans. This positions least with 11.1 percent.

Table 4: Difficulties in meeting these conditions for loans

Condition	Frequency	Percentage
Certificate of occupancy	12	22.2
Approved Building plan	5	9.25
Survey plan	4	7.4
Bill of Quantities	4	7.4
Feasibility and viability report	6	11.1
Evidence of past performance	9	16.7
EIA	6	11.1
Tax clearance	5	9.25
Development Levy receipt	3	5.6
Total	54	100

Source: Field survey, 2023.

From table 4, certificate of occupancy has been discovered to be the most difficult condition for developers to meet in getting loan from these institutions. It takes 22.2 percent of the total respondents. Evidence of past performance is another condition that the developers find difficult to meet. This takes 16.7 percent of the total respondents.

Discussion

The study uncovers that the loan costs being charged by the moneylenders (monetary organizations) are normally extremely high. Different wellsprings of finance for real estate development separated from the value capital incorporate insurance agency and benefits reserves, Government Securities and the different business, vendor and home loan banks in Nigeria. The problems being experienced by real estate engineers in the journey for reserve remember regulatory bottlenecks for the monetary establishments accordingly making reserves challenging to arrive at the designers on time. Guarantee security and authentication of inhabitation as requested by a large portion of these monetary organizations are cause of problems for engineers in getting finance for real estate development.

Because of expansion, the real worth of loan gathered regularly diminished making it unimaginable for the undertaking to be finished with the organized finance. The circumstances under which loans are given especially the momentary loans are normally too severe and multiple times engineers find it hard to meet such terms. There is generally lack of data on how much subsidizing that happens, by whom, or the strategies utilized. This is on the grounds that there is no actual point of convergence where the subsidizing business can be executed, the market is a theoretical collection of discrete, inconsequential and ungraceful financing exchanges and the market is assorted and complex. The resultant impact of these is problem of getting real estate finance. There is consistently non-accessibility of asset to finance real estate development halfway on account of expansion and the enormous capital required. Loan reimbursement is in every case truly challenging because of the significant expense of adjusting the loan by the designers. The waning monetary circumstance in the nation is negatively affecting the development business

consequently decreasing the accessibility of loanable assets for real estate development. Because of long growth period for the development of real estates, most financial backers and loaning foundations are ordinarily put development down thus; it ought not be taken care of with levity by both government, monetary organizations and the real estate engineers.

Conclusion

From the foregoing discussion, it can be concluded that finance plays a vital role in real estate development; hence, it should not be handled with levity by both government, financial institutions and the real estate developers.

Recommendations

It is hereby recommended that a record of past transactions regarding borrowing and lending of finance for real estate development should be kept so as to assist others who would want to go into such transactions in future. Many problems plaguing the success of real estate financing in Nigeria can be solved if our economic problems are solved since most of these problems are due to the inflationary economy that Nigeria faces. Government should intervene in this financing by instructing these financial institutions to slack their stringent rules for lending loan to developers.

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Investigating the application of Data and Data Analytics in Real Estate Investment Decisions Among Lagos Valuers

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Abstract

Incorporating data analytics into real estate investment decisions can provide investors with vital tools and insights to help them manage the intricacies of the real estate market, maximise profits and align their investments with sustainability and ethical considerations. This study investigates how Lagos state valuers leverage data and data analysis approaches to make investment decisions for their clients. The first objective of the research is to identify the appraisal process used by Valuers in their feasibility and viability assessment. The second objective is to determine the type of data collected by Valuers for the preparation of feasibility and viability reports. The third is to identify the significant challenges faced by Valuers in obtaining the required data and how they overcome these challenges in the hope of giving the client the best possible service. Fourth is to examine the role of data analytics in real estate investment decisions, which includes data analysis stages, prospects, and suggested ways Valuers can implement a data-driven culture. Findings from this Study have shown that Real Estate professionals rely on data regarding investment decisions. However, many valuers have yet to explore data analytics or incorporate a data-driven culture in their organisations.

Keywords: Data; Data Analytics; Investment Decision; Feasibility and Viability appraisals

Introduction

As the world moves toward technology, machine learning, artificial intelligence, and data management, the need for Real Estate professionals to adopt technological tools to make data-driven decisions about sale, purchase, rental, and management of properties or Assets demands immediate attention. The process involves Gathering all relevant information from numerous sources and processing it to provide actionable insights. Brokers, investors, developers, owners, and other real estate professionals should rely on real estate data and its analysis to predict the profitability or loss of investment, decide the optimum time to buy or sell, find suitable renters, negotiate successfully, create smart contracts and safer sales, decide on better use of leased space and allocate marketing efforts. Data Analytic literacy is becoming more prevalent in the Real Estate Sector as data and content become more widely available, especially in the Western world.

The world's real estate value reached \$326.5 trillion in 2020, a 5% increase from 2019 and a high record. Growth was driven by residential, which is by far the largest real estate sector, Savills Research (2021). Real Estate is the world's most significant store of wealth, which is more valuable

than all global equities and debt securities combined and almost four times that of global GDP. Many organisations use data to improve various aspects of their operations. Real estate investors need accurate, timely, and reliable information to make sound decisions. Without it, they will either make an incorrect decision that will harm the property investment performance or, even worse, make no decision. (Kadwai, 2022)

Technology adoption in the real estate industry has recently accelerated. With technology, the industry also leverages data as one of its most valuable commodities. Whether understanding market trends or increasing occupancy rates, data helps Real Estate Investors make more informed decisions and maximize their portfolios. Ali Kidwai (2022) When complex data is presented, it can strongly impact your investments. For instance, it can show which markets are ripe for investing and which to avoid. You can analyze past and current trends to assess the income potential. In a recent survey by (Grinis, M, 2022) Ernst & Young, 92% of real estate owners wanted technology that addressed data analytics. However, only 35% of them have adopted suitable tools.

Data Analytics Phenomenon

According to IFAC (2018), Data analytics is a broad term that encompasses many diverse techniques and processes for drawing insights from historical data over time. In other words, It is the practice of examining pre-existing datasets to generate new information and insights that are meaningful, actionable, and can subsequently be utilized to inform and drive intelligent business decisions. With all the disruptive innovations happening in the world and in the Real Estate sector, the field remains untapped, lacking an enormous amount of unused or scarce data. Data is crucial to developing the real Estate industry towards technology and more effective transactions. Nowadays, the software to collect and process all the data that could cause this transformation already exists, such as Building management system (BMS), Buildium, deal check, reannex, zilculator, realdata space use, and prices per zone.

This paper will expose data and big data analytics to understand its current uses, potential, and limitations. Previously, real estate data analytics concentrated on traditional measures such as a property's occupancy rate, rental payments paid by present tenants, and local market trends. However, in recent years, there has been a rising appreciation for non-traditional characteristics influencing market value and informing decision-making, such as the location of bus stop stations, online ratings of local companies, and even the frequency of visitor assessment into commercial buildings. Armed with real estate data analytic software driven by proprietary data, investors are systematically understanding and evaluating with more incredible speed, scale, and precision using deal management software (Carrigan, 2023)

Real Estate Investment Phenomenon

The investment landscape is vast. Bonds, mutual funds, cash, stocks, and Real Estate are all excellent investment options. However, while diversifying investment portfolios is essential, the guiding principle for long-term yield and avoiding significant loss continues to set the pace for

major investment decisions. With a well-chosen asset such as real Estate, you are guaranteed long-term investment yields and risk mitigation. Supply and demand, the economy, demographics, interest rates, government policies, and unforeseen events influence real estate trends, including prices and rental rates.

A maximum level of satisfaction from an investment is what every investor hopes to achieve. A smart investor selects from various potential investments to maximize wealth and returns while reducing risks. The call for feasibility analysis has been driven by the desire to maximize one's investment. The appraisers can use a variety of methodologies to determine if a project is beneficial or not, and they choose the one that best satisfies the investor's goals. Therefore, The kind of data gathered, evaluated, and interpreted for this report becomes necessary since the investor relies heavily on the valuer's professional recommendations.

Valuers conduct feasibility and viability studies for proposed developments ranging from individual residential buildings to massive industrial estates. Generally, a feasibility and viability appraisal include cash flow forecasting, cost-benefit analysis, and profit margin comparisons and is mostly done to determine the project's practicability and profitability. It also allows the developer or client to choose between alternative developments. It determines the type of development that could be done on a specific piece of land and the intensity of use. Reports are typically generated as a working blueprint for further client decisions and critical cost-benefit decisions before project embarking. As a result, accurate, timely, and reliable information is vital for any real estate investor to make sound decisions. If they are not prioritized, they are likely to fail. With data analytics, real estate management companies can manage building operations efficiently and boost property value. Who knows what they might find if they have the correct data-driven insight?

Data drive strategic decisions globally as this minimises risks and enthrones market confidence on the part of investors. Demand for real Estate is a derived demand. Property development and redevelopment are market responses to the dynamics of socio-economic needs of the community or society, which may include the need for space, extension of roads and utilities, building up of vacant sites, modification and change of use, etc. (Otegbulu, 2022) This decision must be made with market data for reliability. However, this differs from the situation in most cases in Nigeria, including Lagos, the study area. Most developers depend on experience, clairvoyance, and guesswork, hoping everything will come out fine.

Most developments still need to be sold or occupied for a prolonged period. Developers need information on population, income, employment, change in taste and preference, technology, substitute property, etc. Data on this must be collected, collated, and analyzed for application for investment decisions. Most developers operate on the wrong assumption that strong and booming markets guarantee a good development opportunity and that a weak market implies that a well-conceived development cannot be successfully implemented. The critical question to ask before real estate investment decisions is if a market needs to be satisfied or a market segment needs to be served. Data Analytics is critical to a successful real estate investment decision and a panacea to development failure. Market research does not support most development projects, which is the foundation of any market analysis. Development financiers and bankers are complaining about

non-data-driven pre-investment reports. Most of the reports also need more reliable and current data and analysis, hence the need for this study.

This is a study on data analytics, generally described as providing investors with facts and figures about intended investment decisions. This will cover the appraisal process adopted by valuers in feasibility and viability studies, property type commonly approved by development surveyors, nature of data collected for analysis, examines the role of data analytics in real estate investment decisions, which includes data analysis stages, prospects and challenges encountered by appraisers in carrying out investment decision analysis and suggested ways Valuers can implement a data-driven culture.

Finally, the study will undertake a content analysis of different feasibility and viability reports to determine compliance with standard data analysis. The study will be limited to development Decisions on feasibility and viability reports because this is the source of development failure.

Literature Review

We shall be reviewing related literature on the subject of discussion, investigating the application of Data analytics for real estate investment covering appraisal process, Challenges of investment appraisal, Data requirements for investment decisions, the role of data analytics in real estate investment decisions, which includes data analysis stages, prospects, and suggested ways Valuers can implement a data-driven culture amongst other.

Appraisal Process:

The appraisal process is quite distinct from the development process. Appraisal processes are steps the appraiser takes to guide the investor or developer in making an informed investment decision. Development is both an art and a science, and all rational developers follow a logical sequence from the period they first conceive the idea of the project to the time the physical construction concludes (Otegbulu, 2022). On the other hand, the appraisal process is accomplished following specific steps, the number of which depends on the nature of the appraisal assignment and the data available to complete it.

This process includes the identification of the problem, the scope of work, and the determination of data collection covering market data, specific characteristics of the site and improvements, if any, comparable property data on sales, rentals, vacancy, competition, income and expenses, yields, etc. This is followed by a market analysis of demand and supply studies, marketability studies and highest and best use analysis (Otegbulu, 2022; Fanning, 2005; Delosle, 2010).

Farragher and Savage (2008) stated that to make sound real estate investment decisions, applying experience, good judgment and creativity in a sophisticated decision-making process is required. Their study shows that most investors focus on decision-making processes that include setting strategy, establishing risk/return goals, searching for investment opportunities, forecasting expected returns, evaluating forecast returns, assessing risk, adjusting for risk, decision-making,

implementing accepted proposals, and auditing operating performance. Equity investors mainly adopt this process in real Estate. However, the process is also applicable to real estate investment decisions.

Data Requirement

As indicated earlier in this paper, accurate, timely, and reliable information is crucial for effective investment decision-making. The investor will require information concerning the direction of socio-economic variables driving the property market. They need to know what rent, yield, and price will be at an estimated time frame (Otegbulu, 2022). The level of employment also influences demand for real Estate. Firms' prosperity, in turn, determines the level of employment, which sets the general level of household income. Increasing household income will boost their capacity to spend on housing and rentals. (Memahan 2015, Jonnason and Drick 2018) Different projects will require different data inputs. Despite these, the significant drivers of demand for development remain income, the country's economic situation, vacancy level, competition, income level risk factors, etc. Real estate decisions can only be sustainable in the presence of reliable data. Li (2021) says establishing a high-quality and reliable information management system significantly enhances efficiency in real estate investment decisions and marketing. The author further argued that data has penetrated various industries and businesses and has gradually become a vital product factor. The analysis and application of massive data by real estate companies can effectively predict consumer demand and productivity growth and provide a reference for investment decision-making and strategy formulation.

Considering the enormous amount of data required for real Estate, particularly commercial development, Nair (2011) highlights potential investors need to make more informed and better decisions. For example, potential investors need to penetrate deep into research on the location and demand factors of the proposed investment, mainly the attractiveness of the location of the proposed development, the employment market, the regional or local economy, and the population growth. The author further explained the need to evaluate property-specific attributes like current and future cash flows, vacancy rate, maintenance and repairs, taxes, lease terms, etc. Geitner and Miller (2007) emphasised the need to take inventory of existing supply, identify sources of space usage demand, forecast demand and new supply sources and their decision implications.

Information is critical to real estate investment decisions, but the collected data must be screened and analysed before application. Investors and appraisers must understand and process data characteristics before using them. (Li 2021) Accurate, timely, and reliable information is crucial for effective decision-making relating to real estate investment. In the absence of this, you end up making an inappropriate decision that could damage property investment performance. With technology, the real estate industry also leverages data as one of its largest commodities. (Polestar 2022, Carnagan 2023)

Data Analytics and Real Estate Investment Decisions

Data analytics is increasingly becoming an integral part of the real estate investment decision process, enabling investors to make a more informed choice, mitigate risks, and optimise returns in real estate market analysis by tracking market trends- property prices, property types, market conditions, rental rate, occupying rate, population growth, job opportunities, infrastructure development, and other market indicators, etc. Real Estate data are highly heterogeneous. The Modeling and controlling of this complex data related to real estate decisions require much data to be analysed. (Li and Tang, 2009) Data analysis encourages precision in data used for investment decisions and employing scientific methods, which can produce a comprehensive analytic framework for solving real estate investment decision-making challenges (Tang & Li, 2009).

The application of data analytics has emerged as a revolutionary force in the ever-changing landscape of real estate markets and investment strategies. Institutional and individual investors increasingly use data-driven insights to guide decision-making processes, maximise portfolio performance, and limit risks. This paradigm shift represents a recognition of the power of data analytics in improving investment outcomes. In this context, data analytics emerges as a strong force, promising to alter how real estate investment decisions are made and executed.

Data analytics, broadly defined as the systematic analysis of data to extract meaningful insights, has found many applications within data analysis to solve almost all problems in the real estate sector: attracting clients, improving the quality of services, etc. In addition, increasing the reporting speed and quality increases the depth of data analysis and coverage (Bean Randy, 2016). The rapid development of IT technologies used for analysing big data in the real estate sector (one of the leaders in this segment) has different directions. The demand for data and data analytics technologies and services in the global market is stimulated by an increase in data volumes, the emergence of new technologies, and cultural progress toward decision-making in various areas Biktimirov (2016).

There is a need for real estate decision-makers to prepare for cultural and business change. However, some large firms have invested in optimising existing infrastructure to match the speed and cost benefits of Data and its analytics. New tools and approaches are displacing whole data ecosystems. A new generation of data professionals is now emerging. They have grown up using statistical techniques and languages like Hadoop and R, and as they enter the workplace in more significant numbers, traditional approaches to data management and analytics will give way to these new techniques (Bean Randy 2016).

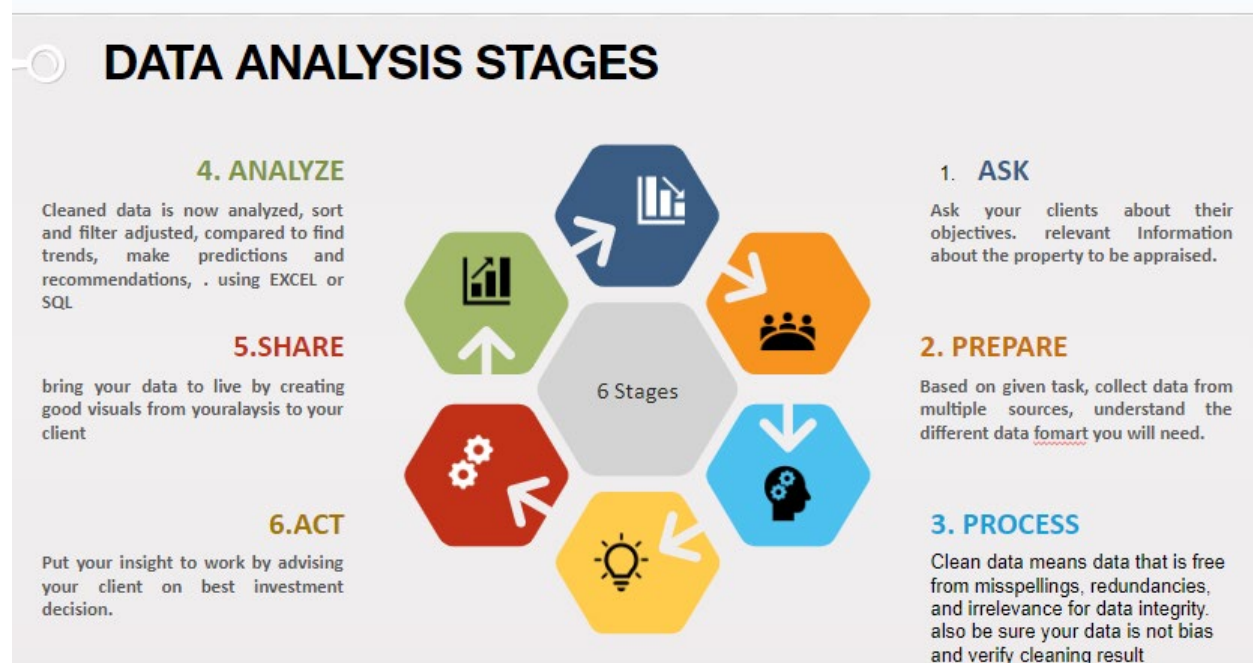
Companies need to improve in their effort to be data-driven. The percentage of firms identifying themselves as being data-driven has declined in the past three years — from 37.1% in 2017 to 32.4% in 2018 to 31.0% this year. Despite increasing investment in data and AI initiatives, these sobering results and declines have come. Whatever the reasons for the failure to achieve transformational results from data initiatives, the amount of data continues to rise in business and society. Analytical decisions and actions are generally based on intuition and experience. In short, the need for data-driven organisations and cultures is not going away. (Bean 2019)

Nowadays, we live in the technology age where a massive amount of digital data is generated exponentially at an unprecedented speed. This evolution of data is accompanied by an advance in technologies that enable organizations to collect, store, manage, and analyze such data to transform it into information and knowledge. This phenomenon is known as Big Data (Ylijoki, O 2016)

It is commonly said that Big Data has three defining attributes, also known as "3 V" s", those being volume (for the giant amount of data to be dealt with), variety (for the heterogeneity of formats such as texts, sensors, audio, video, graphs that it can warehouse and generate) and velocity (for the continuous and fast stream of data it processes) (Bilal et al., 2016). This section will explore how to deal with this data and generate value with its caption and storage.

Analysis has been in operation for a long time, but there are differences between conventional and big data analysis.

Big Data Analysis Framework for Real Estate Investment Analysis



Prospects Of Data Analytics Application in Real Investment Analysis

Data analytics in real estate investment analysis provides various benefits that can significantly improve decision-making and investment strategies. Improved Decision-Making: Data analytics provides real estate investors with data-driven insights, enabling them to make more informed, detailed, objective, and precise investment decisions. Enhanced Risk Assessment: By analysing historical data and identifying potential risks, data analytics helps investors assess and mitigate risks, leading to more resilient investment portfolios Market Insights: Data analytics can uncover valuable market insights, including trends, demand-supply dynamics, and emerging opportunities,

which inform investment strategies
Predictive Modeling: Data analytics allows for predictive modelling, which can forecast property performance, vacancy rates, and rental income, aiding in investment planning and asset management.

Portfolio Optimisation: Investors can use data analytics to optimise their real estate portfolios by balancing risk and return, leading to more diversified and profitable investments.

Sustainability Analysis: Data analytics helps assess the sustainability and environmental impact of real estate investments, aligning portfolios with ESG (Environmental et al.) goals.

Operational Efficiency: Property and asset management can be optimised through data analytics, reducing operational costs and maximising revenue.

Cost Reduction: Data analytics can identify cost-saving opportunities in property maintenance, energy consumption, and other operational aspects.

Backtesting Strategies: Investors can use historical data to backtest various investment strategies, refining their approaches for better outcomes.

Continuous Learning: Data analytics encourages a culture of continuous learning as investors adapt and improve their strategies based on data-driven insights and performance feedback.

Customisation: Investors can customise their strategies and decisions based on specific goals and risk tolerances, utilising data analytics to tailor investments to their preferences.

Transparency: promotes transparency and Data integrity in real estate investments by providing precise data sources and methodologies, which can enhance trust among investors.

Investments diversification: data being used to identify markets to be explored related to the activities already developed and assets already acquired, diversifying the portfolio and the business.

How Can Estate Surveyors Implement a Data-Driven Culture?

We cannot talk about data analytics without data. There should be an approach to how we can grow our data bank and generally imbibe the data-driven culture in our organisations to more informed decision-making, improve efficiency, and enhance client services. The developed countries are growing their property data centres and making information accessible to all, which has led to the establishment of prop-techs and shared economy platforms like Airbnb, WeWork, Opendoor, Compass, and Homelight and real estate Fintech platforms that facilitate the trading of real estate ownership (Crowdfunding, equity raising platforms, remote investors platforms, etc.).

To implement a data-driven culture, Begin with leadership commitment. Top management should understand the value of data-driven decision-making and actively support the cultural shift, Develop a clear data strategy that outlines the objectives, Identify relevant data sources, both internal (e.g., property records, transaction data) and external (e.g., market trends, demographic data), and integrate them into a centralised data repository, Establish data governance policies and

procedures to ensure data quality, consistency, security, and compliance with regulations, Implement data quality checks and validation processes to ensure the accuracy and reliability of data. Provide training and resources to equip estate surveyors in your organisation with the necessary data analytics skills, including data visualisation and statistical analysis. Invest in data visualisation tools that allow estate surveyors to create informative and actionable visual reports and dashboards, assemble a team of data analysts or data scientists to analyse data, uncover insights, support decision-making, Client Educate clients on the benefits of data-driven insights and involve them in the process, sharing data-backed recommendations and insights. Regular Data Reviews and Update: Schedule regular data review meetings where estate surveyors discuss findings, insights, and trends to inform strategies; establish feedback loops where estate surveyors can provide input on data tools, processes, and analytics to improve the data-driven culture continuously; ensure strict data privacy and security measures are in place to protect sensitive information, Foster collaboration between estate surveyors, data analysts, and other stakeholders to ensure that data insights are integrated into decision-making processes. Finally, continuously evaluate and refine data-driven processes and strategies based on feedback and changing market conditions.

Methods

This chapter is focused on data presentation, evaluation and analysis of respondents' opinions according to the stated objectives and research questions. For this purpose, the data analysis and presentation are divided into three parts. The first part is the analysis of respondents' demographic information. The second section presents the results from the statistical analysis of primary research questions.

One hundred and twenty (120) copies of the questionnaire were administered to study participants; one hundred and three (103) compositions were adequately filled and returned on schedule, giving an 86% response rate. Data analysis is, therefore, based on the number of produced copies of the questionnaire.

Findings

This section of the study and results concerns responses to the research questions in the survey questionnaire. It begins with the analyses of respondents' socio-demographic data, after which the answers to the main items of the research questions are analysed and interpreted.

Table 4.1 Years of Practicing as an Estate Surveyor and Valuer

	Frequency	Percentage
0-5yrs	13	12.6
6-15yrs	43	41.7
16-20yrs	13	12.6
Above 20yrs	34	33
Total	103	100

Source: Field Survey, 2023

Table 4.2: Firms Carrying out Feasibility and Viability Appraisal

	Frequency	Percentage
Yes	102	99
No	1	1
Total	103	100

Source: Field Survey, 2023

Table 4.3: Familiarity with the Concept of Data Analytics in the Context of Real Estate Investment Analysis

	Frequency	Percentage
Very familiar	37	35.9
Somewhat familiar	7	6.8
Not familiar at all	59	57.3
Total	103	100

Source: Field Survey, 2023

Table 4.3 above shows the familiarity with data analytics in the context of real estate investment analysis. 35.9% of the respondents are very familiar with the concept of data analytics in the context of real estate investment analysis, 6.8% are somewhat familiar, and 57.3% are not familiar at all with the concept of data analytics in the context of real estate investment analysis. Most

respondents need to become more familiar with data analytics in the context of real estate investment analysis.

Table 4.4: Reliance on data in real estate investment analysis

	Frequency	Percentage
Yes	92	89.3
No	11	10.7
Total	103	100

Source: Field Survey, 2023

Table 4.4 above shows the frequency distribution of respondents on the usage of data or relied on real estate investment analysis. 89.3% of the respondents relied on real estate investment analysis data, while 10.7% did not rely on data analytics tools/systems in real estate investment analysis. This shows respondents relied on data analytics tools/systems in real estate investment analysis.

Table 4.5: Refine and Adjust Data Collection from either Primary or Secondary Sources before Advising Client Investment Decision

	Frequency	Percentage
Yes	86	83.5
No	17	16.5
Total	103	100

Source: Field Survey, 2023

Table 4.6: Type of Property often Undertake in Feasibility and Viability Appraisal

	Frequency	Percentage
Residential	54	52.4
Shopping Plaza	23	22.3
Office Building	12	11.7
Hotel	10	9.7

Petrol Stations	2	1.9
Industrial Property	2	1.9
Total	103	100

Table 4.7: Sources of data used for pre-investment Study

	Frequency	Percentage
Newspaper	3	2.9
Questionnaire	14	13.6
Online	12	11.7
Information from Estate firm and property company on current property transaction	60	58.3
Stored information from files and archives of property company and estate surveying	6	5.8
Published statistical data	8	7.8
Total	103	100

Source: Field Survey, 2023

Table 4.8: Agreement to the Usage of Data Analytic Tools to Influence Real Estate Investment Strategy

	Frequency	Percentage
Yes. Significantly	73	70.9
Yes, Moderately	22	21.4
I'm not sure	8	7.8
Total	103	100

Source: Field Survey, 2023

Table 4.9 Ranking of Challenges encountered by Estate Surveyor in Carrying out Feasibility and Viability Studies

	Mean	Rank
Lack of a central data system in real estate	4.33	1
Lack of empirical data	4.13	2
Reluctance in disclosing information	4.11	3
Providing wrong information	4.02	4
Non-disclosure of information by stakeholders in the building industry	4.00	5
Poor/non keeping of transaction records by estate surveying firms	3.94	6
Analyzing and refining data	3.93	7
Mismatch of information requested and supplied	3.79	8
Wrong application of data	3.66	9
Inadequate arrangement or preparation before commencement of the study	3.42	10
Poor knowledge of IT by most Estate Surveyors	3.32	11

Source: Field Survey, 2023

Table 4.10: Prospect of Data Analytics in Real Estate Investment Analysis in the next 5-10yrs

	Frequency	Percentage
Yes	96	93.2
No	7	6.8
Total	103	100

Source: Field Survey, 2023

Table 4.12: Willingness to adopt and Explore Data Analytic tools in Analyzing Large Data for Investment Decision

	Frequency	Percentage
Yes	33	32
No Response	70	68
Total	103	100

Source: Field Survey, 2023

Table 4.12 shows that all respondents are willing to adopt and explore data analytics in analysing extensive data for investment decision.

Table 4.13 Software used in the office to get work done quickly.

Online Property Marketing Apps.
Property management software, Virtual reality (VR) tools
Microsoft Excel, Microsoft Word, google Maps, Google Earth, AutoCAD
Artificial intelligence, Big data etc.
Moxiworks

The above software is primarily used in the office to get work done quickly.

Table 4.14 Challenges for Data and Data analytics becoming fully embedded into Feasibility and Viability Appraisal

Lack of understanding of the benefits it can bring	73	70.9
Data storage and sustainability	8	7.8
Cost of implementation (buying software and training staff)	22	21.4
Total	103	100

Source: Field Survey, 2023

Summary of Findings

While most Valuers rely on data in investment appraisals, most Estate Surveyors and Valuers need to familiarise themselves with data analytics in investment appraisal.

Information from Estate firms and companies on current property transactions remains the most used secondary data source for pre-investment Study.

Most surveyors are willing to adopt and explore data analytic tools in analysing extensive data for investment decisions.

Poor knowledge of IT by most Estate Surveyors has been ranked as one of the Challenges encountered by Estate Surveyors in Carrying out Feasibility and Viability Studies.

Lack of understanding of the benefits it can bring is ranked as the reason why data analytics is yet to be fully embedded into the feasibility and viability appraisal process.

All respondents agreed to the positive of data Analytics in Real Estate investment analysis in the next 5-10 years.

Recommendation

Embrace a Data-Driven Decision Culture: Estate Surveyors should Foster a culture that values data-driven decision-making within their organisation. Encourage all team members to actively seek out data, analyse it, and incorporate data insights into their daily tasks, including property appraisals and investment, While investing in technological tools.

Invest in training IT programs for staff that enable Estate Surveyors to leverage advanced analytics techniques such as machine learning, predictive modelling, and spatial analysis. These techniques can provide deeper insights into property performance and market trends.

Collaborate with experts from other fields, such as data science, economics, and urban planning. Cross-disciplinary collaborations provide fresh perspectives and access to specialised knowledge that can enhance data analytics efforts.

Estate Surveyors and Valuers should build and update a property database- Gather relevant data from various sources, including property listings, historical transaction data, market trends, and economic indicators, and be willing to release or share data with other professionals.

Continuously monitor the real estate market for good investment analysis by conducting market research. This involves analysing data on supply and demand, demographics, zoning regulations, and infrastructure development. Market research can help identify emerging trends and investment opportunities.

Conclusion

Implementing a data-driven culture requires commitment, resources, and a systematic approach. Over time, it can significantly enhance the capabilities of real estate surveyors, leading to more effective investment decision-making, better client services, and a competitive advantage in the real estate industry. Incorporating data analytics into real estate investment analysis can empower investors with valuable tools and insights to navigate the complexities of the real estate market, optimise returns, and align their investments with sustainability and ethical considerations. While we are yet to explore generative AI, Machine learning, robotics and automation, We still believe that data is a driving force behind other disruptive innovations.

Acknowledgement

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**Non-Peer Reviewed*

Biodigester and Biogas Technology as Veritable Tool for Poultry Waste Management in the Federal Capital Territory, Abuja, Nigeria

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Abstract

Poultry waste management is multidimensional and involves public health, waste management, utilization of fertilizing value, and fuel and energy production issues. The poultry industry in FCT Abuja, Nigeria, faces significant challenges in managing the large quantities of organic waste generated, which can have detrimental effects on the environment and public health if not properly handled. This thesis explores the potential of biodigester and biogas production as a sustainable and efficient technology for poultry waste management in FCT Abuja, Nigeria. The study aims to assess the feasibility, economic viability, benefits, and limitations of biodigester and biogas technology in managing poultry waste, providing valuable insights for policymakers, poultry farmers, and environmental stakeholders.

The intent of the study is also to show that the chicken waste used as feed material to produce biogas can tap additional energy from the otherwise wasted energy and make the poultry industry co-exist with the environment of the neighbours. This research will identify and evaluate the economic feasibility of producing biogas from poultry waste. The research is of particular interest to the poultry farmers and to Waru community of Federal Capital Territory, Abuja, Nigeria, as the people are becoming very conscious of the environmental impact due to pollution. This will also solve the crisis of offensive smell emanating from the poultry farm, causing disputes between the poultry farmer and the host Waru Community.

Keywords: Bio-digestion, Biomass, Biogas, Poultry Waste, Renewable Energy, Slurry

1.1 Background

Poultry is an important subsector of the livestock industry and the fastest-growing agricultural enterprise in Bangladesh (Rahman M, Chowdhury E, Parvin R. 2021). Rahman M, Chowdhury E, Parvin R. 2021, It contributes significantly to the economy of Bangladesh by providing employment opportunities in rural and semiurban areas, as well as accessible protein sources for the growing population. According to Jabbar MA, Rahman M, Talukder RK, Raha S 2021; Poultry production has grown from 91 million in 1,990 to 365.85 million in the fiscal year of 2020–2021, owing to the huge demand for poultry meat and eggs.

This research embarks on a mission to delve into an innovative paradigm of poultry waste management, one that revolves around the creation of a cutting-edge digester system employing locally sourced materials. At its core, this transformative digester system aspires to revolutionize the conventional waste management landscape by ingeniously harnessing poultry waste as its primary feedstock. This resourceful approach promises a dual benefit – the generation of biogas

to satiate the voracious energy appetite and the production of nutrient-rich digestate, a potent organic fertilizer poised to breathe life into the earth. This dual-pronged approach epitomizes the synergistic relationship between sustainable energy generation and eco-friendly waste management.

As the world grapples with the necessity of embracing renewable energy, biomass stands out as a formidable contender, reigning as the predominant source of renewable energy in the contemporary milieu. Astonishingly, despite its colossal potential, a significant chunk of this resource remains untapped, holding untold possibilities. Against this backdrop, amplifying bioenergy's contribution, whether through electricity generation or as fuel for transportation, emerges as a tangible strategy for not only curbing the ominous specter of global warming but also bolstering energy security. Additionally, this pursuit unfolds pathways to unlock latent waste management potentials, particularly in rural and peri-urban settings, consequently orchestrating a harmonious symphony of employment creation and sustainable growth (Yue et al., 2014).

Yet, the journey towards seamlessly integrating bioenergy into the energy matrix is not devoid of challenges. Robust supply chain networks assume paramount significance as they constitute the bedrock on which the sustainable incorporation of bioenergy hinges. In essence, this expedition underscores the intricate interplay between innovative technologies, localized resource utilization, and the imperative of a resilient supply chain to realize the promise of a greener, more energy-abundant future.

Research objectives

The specific objectives of the research are the following:

- 1 To determine the quality of the produced Biogas in terms of physical, mechanical and thermal properties.
- 2 To evaluate the performance of Biogas in domestic cooking applications by determination of fuel properties and combustion behaviour.
- 3 To assess the economic feasibility of a household scale Biogas production based on the estimation of production cost and revenues.

Research Questions

This research addresses six closely linked objectives and will focus on answering the following questions.

1. What are the conventional poultry waste disposal system in the FCT, Abuja
2. Can poultry waste be converted into biogas?
3. What is the quality of the biogas in terms of physical, mechanical, and thermal properties?
4. How will the developed biogas perform in a domestic cooking application? How long will it take for the biogas to ignite and boil water?
5. How much will it cost to produce the biogas using poultry waste bio-digestive technique?
6. How economically viable will this technology be for application in rural communities of the study area?

2.1 Waste Generation:

Waste generation is made up of activities in which materials are identified as not being useful and are either disposed or not of value. According to a World Bank Report in 2018, global annual waste generation is expected to jump to 3.4 billion tones over the next 30 years, up from 2.01 billion tones in 2016. The volume and range of solid waste generated daily in Nigeria has been increasing within the last few years and this is due to high population growth, urbanization, industrialization and general economic growth.

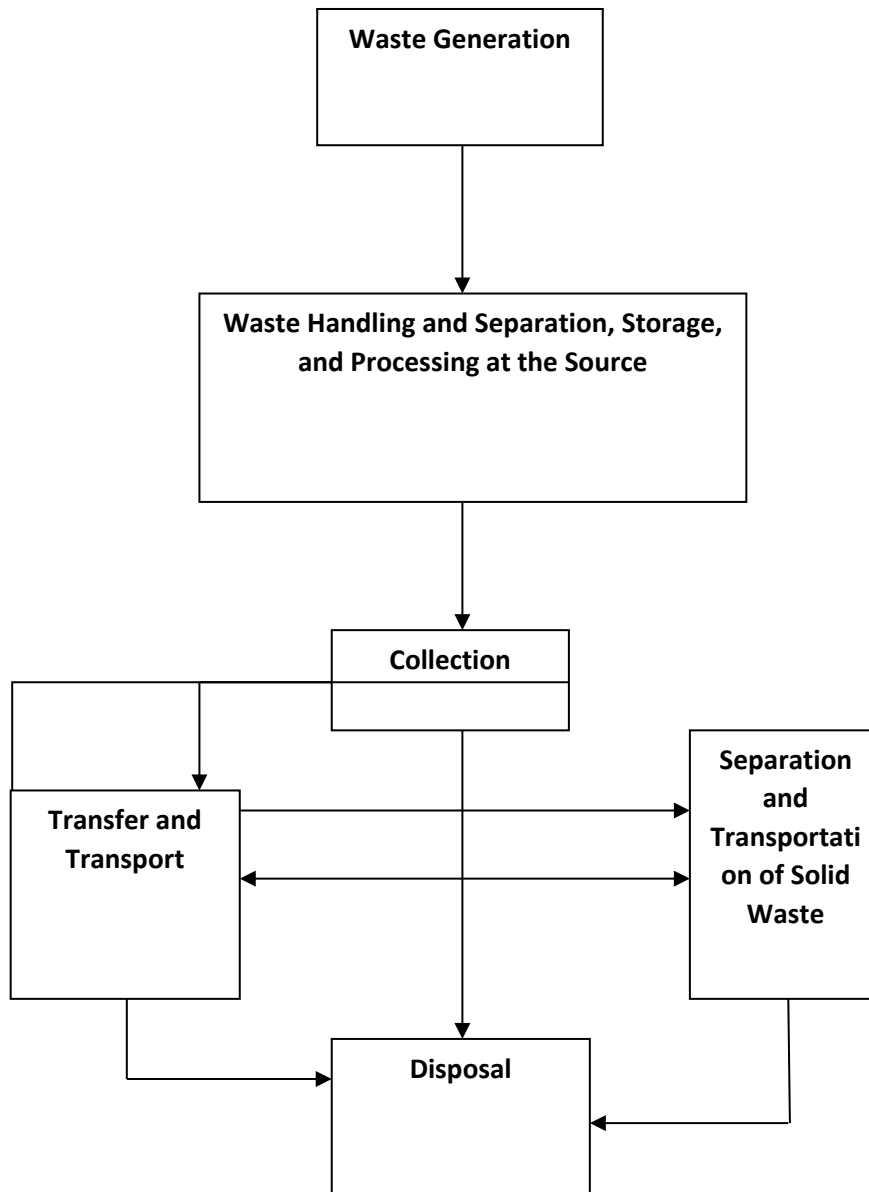


Figure 1: Interrelationship of Functional Elements of Solid Waste Management

Source: Tchobanoglous, G., Theisen, H. and Vigil, S. (1993). Integrated Solid Waste: Engineering principles and management issues. McGraw-Hill Publishing company, USA.

2.1.1 Waste Storage:

According to Kreith, F. (1994), it is widely explained to mean where solid waste is stored before it is collected. It is usually in dustbins and not supposed to be thrown away indiscriminately. Storage is of primary importance since it adds to aesthetic consideration.

2.1.2 Waste Collection:

Collection of the stored waste is another important element in solid waste management processes. The waste stored is collected and hauled to the location where the collection vehicle/vector is emptied. According to Thakur, Dr Rjendra Singh. 2019; in developed climates like America, the most common type of residential collection services include “backyard carry” and “setout-setback” Individual bins/containers are also placed alongside shops and residential areas, which are emptied directly into the trucks/tippers. This method prevents people from dumping waste indiscriminately. On the flip side, the procurement and provision of waste bins and containers may seem expensive to implement in Nigeria and Bwari for that matter. This cannot be unconnected with the poor maintenance culture of Nigeria as a whole.

2.1.3 Transfer and Transport:

DEVEX, 2019 stated that transfer and transport often involves two steps. The first concerns itself with the transfer of wastes from the smaller collection vehicles to the larger transport equipment while the second concerns itself with the subsequent transport of the wastes, usually over long distances to the final disposal site.

2.1.4 Processing and Recovery:

Waste processing and recovery includes all technology, equipment and facilities deployed to improve the efficiency of other stages in recovering usable materials, conversion of products or energy. In recovery, separation operations have been devised to ensure that valuable resources are recovered from the mixed solid wastes delivered to solid waste processing plants or transfer stations.

2.1.5 Disposal:

This is the ultimate fate of all solid wastes including residential waste collected and transported directly to landfill site. Several methods of solid waste management have evolved over the years. These methods according to the Centre for Environment and Development in 2003 vary greatly with type of wastes and local conditions. This is divided into early solid waste management practices and contemporary methods of solid waste management.

2.2 Concept of Biogas and Bio-digestion

At the end of 2019, the global amount of biogas plant capacity was about 19.5 GW with growth in capacity being fueled by among others, high fossil fuel prices, cheap and easy access to biomass feedstock, and concerns over emissions and global warming (S. T. Chen, H. I. Kuo, and C. C. Chen, 2007). The most common feedstock used to produce biogas are wastes, like domestic wastes, i.e., food, vegetables, fruits, and animal wastes like dung, poultry dropping, or public moist wastes from food cafes and restaurants, markets, and biological waste from industries having high moisture content and high degradability (M. J. B. Kabeyi and A. O. Oludapo, 2020). Biogas production by anaerobic digestion enhances the country's energy basket status and significantly contributes to natural resource conservation and environmental protection (F. Scholwin and M. Nellas, 2012; M. J. B. Kabeyi and O. A. Olarewaju, 2022; S. Achinas, V. Ahinas and G. J. W. Wuverink, 2017; and B. Afework, J. Hanannia, J. Jenden, K. Stenhouse, and J. Donev, 2022).

Biogas is produced by the anaerobic action of a class of bacteria under suitable conditions. Gas is an environmentally friendly energy resource with a calorific value between 21 and 24 MJ/m³ [30]. Natural anaerobic biodegrading of organic matter releases 590–800 million tons of methane into the atmosphere due to uncontrolled natural biodegradation. Biogas recovery systems apply controlled conditions in the biodegradation of biomass for the production of biogas for energy application (P. C. Joale, P. F. Ricardo, and T. G. I. Medina, 2011). Biogas generally contains 50–70% methane and 30–50% carbon dioxide, based on the type of substrate used and process control and management. Other constituents are hydrogen sulfide and nitrogen, among others. With larger plants, biogas can be supplied into gas networks upon enrichment. Anaerobic digesters are generally designed to operate in the mesophilic (20–40°C) or thermophilic (above 40°C) temperature zones (M. J. B. Kabeyi and A. O. Oludapo, 2020).

Anaerobic digestion of wastes for sanitation and use of biogas as an energy carrier has existed for long worldwide. Digested wastes from biogas plants are also used widely as a valuable fertilizer in farming. In Germany, the share of biogas in electricity generation was about 4.5% in 2013 because of favorable pricing of electricity generated from renewable sources which saw biogas plants increase from about 140 in 1992 to about 7,720 by the end of 2013. As a midterm strategy, biogas has a potential to fill up the residual load from electricity generation based on wind and photovoltaic (M. Lebuhn, B. Munk, and M. Effenberger, 2014).

Biogas generally contains 30–70% methane and 30–50% CO₂, which depends on the substrate fed to the digester. Other constituents of biogas are small volumes of hydrogen. The typical heating

value of 21–24 MJ/m³ or 6 kWh/m³ is suitable for cooking, heating, lighting, or electricity production while a large plant with biomethanation can supply enriched biogas into gas supply networks or mains (S. Kabasci, 2009). Biogas production technologies used to recover biogas from biomass harness anaerobic degradation pathways by the action of a suite of bacteria which exist in form of at least three bacterial communities needed by the biochemical chain that finally produce methane alongside other gases (P. C. Joale, P. F. Ricardo, and T. G. I. Medina, 2011).

2.3 Production of Biogas

Typically, it has following parts –

- Mixing tank
- Inlet chamber
- Digester
- Outlet chamber
- Overflow tank

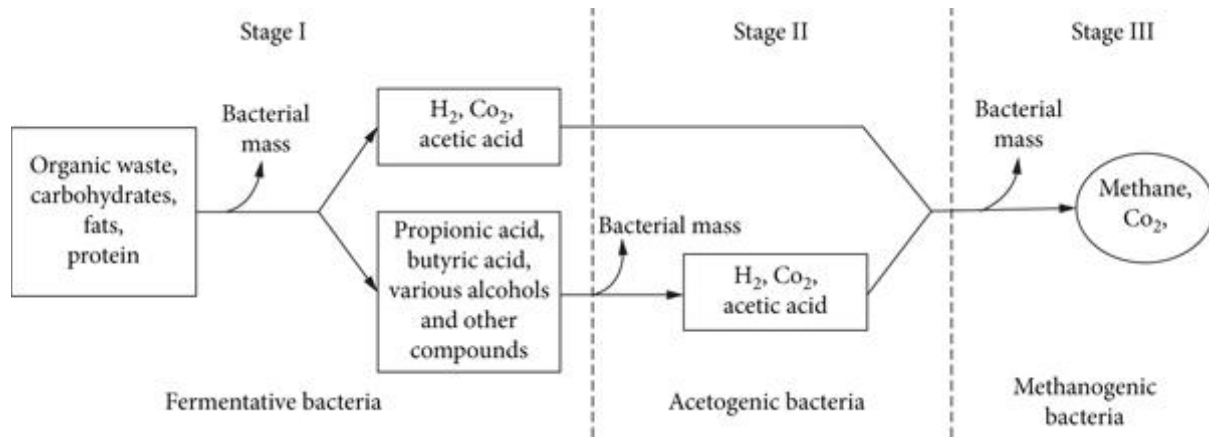


Figure 2 Summary of the biogas formation process

Figure 2 summarizes the process into three stages with hydrolysis and acidogenesis combined.

From Figure 2, it is noted that biogas production is divided into three main stages, i.e., stage I which involves the action of fermentative bacteria, stage II which involves the action of acetogenic bacteria, and stage III which involves action by methanogenic bacteria. Proper management of the three stages ensures optimum production of biogas.

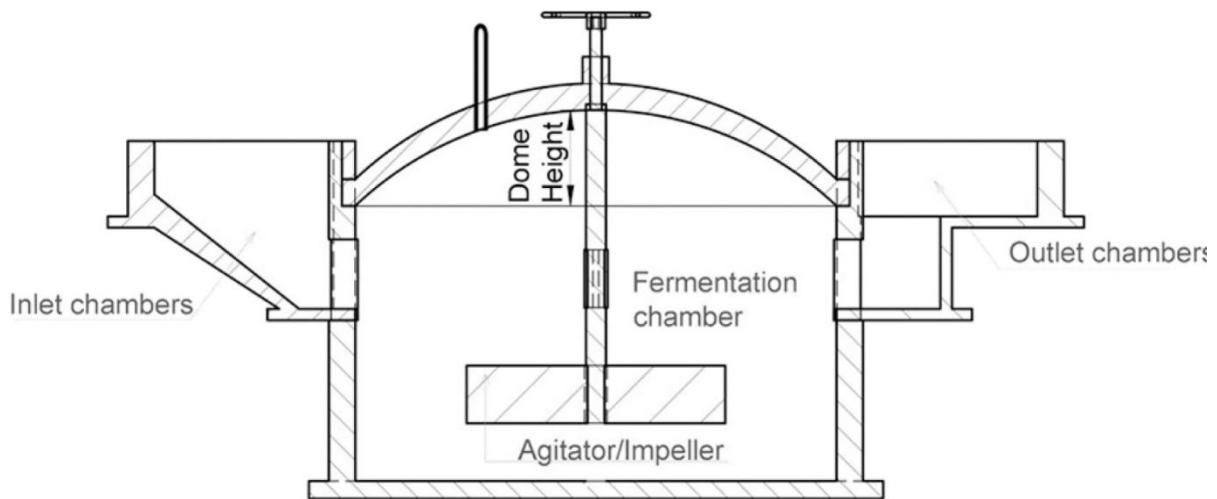


Fig. 1: Conventional Digester design

A digester is a specialized vessel used in various industrial processes, such as wastewater treatment and biogas production, to facilitate the decomposition of organic materials. The digester typically consists of distinct components, each serving a crucial role.

The inlet is the point through which organic material, such as sewage or biomass, is introduced into the digester. This input serves as the substrate for the biological reactions taking place within the system.

The outlet is the exit point where the processed materials, such as treated wastewater or digested slurry, are discharged from the digester. This output is significantly transformed compared to the influent, with reduced organic content and improved environmental compatibility.

The gas chamber is a separate section within the digester designed to capture and store the biogas produced during the anaerobic digestion process. Biogas is composed mainly of methane and carbon dioxide and can be used as a renewable energy source for heating or electricity generation.

An agitator is a mechanical device placed within the digester to ensure proper mixing of the substrate, microorganisms, and nutrients. This mixing promotes uniform microbial activity and optimal digestion conditions, enhancing the breakdown of organic matter and the generation of biogas.

The combination of these components within the digester structure allows for efficient conversion of organic materials into valuable byproducts, such as biogas and stabilized solids. This process is not only environmentally beneficial but also offers the potential for resource recovery and energy generation, contributing to sustainable waste management and energy production practices.

3.1.0 Introduction

The materials used to produce the Biogas and the methodology employed in the production and determination of their quality, performance and cost are described in this chapter. Additionally, the statistical analysis used to obtain results from the data generated was explained.

3.2.0 Description of the Study Area

The study was conducted in Phreta Farm located at Waru Village in Abuja Municipal Area Council of the Federal Capital Territory, Abuja, Nigeria. Phreta Farm is located about 15km to the south of the city of Abuja and the capital city of Nigeria. And situated at 9°26' N latitude and 42°03'E longitude with an altitude of 1980 meters above sea level (Mishiraet al., 2004). However, the experiment is being conducted from July to August, 2023 at the laboratory of Animal Care in Karu, FCT, Abuja, Nigeria or the Laboratory of National Biotechnology Development Agency, Abuja, Nigeria.

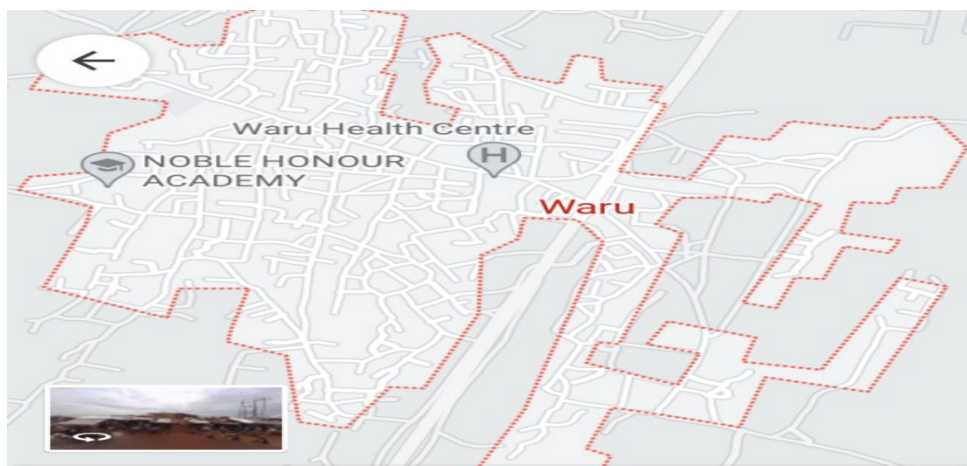


Fig. 3.2.0: Location of the Study area

Research Design Framework

A mixed method approach was used in this research: experimental and survey design method. In the experimental design, being an attempt to establish cause-effect relationships among variables, an independent variable (biomass combination) was manipulated to determine the effects on the dependent variables (physical, mechanical and thermal properties) of Biogas developed from Poultry Waste and Bio-Digestive Processes. The variables were measured numerically and analysed by statistical techniques using software. The survey method required generating information from primary and secondary sources. The primary source involved market survey of the prices of commodities while the secondary information was sourced from literature and web pages of specific government agencies in Nigeria. Figure 3.1 summarizes the design of the research methodology.

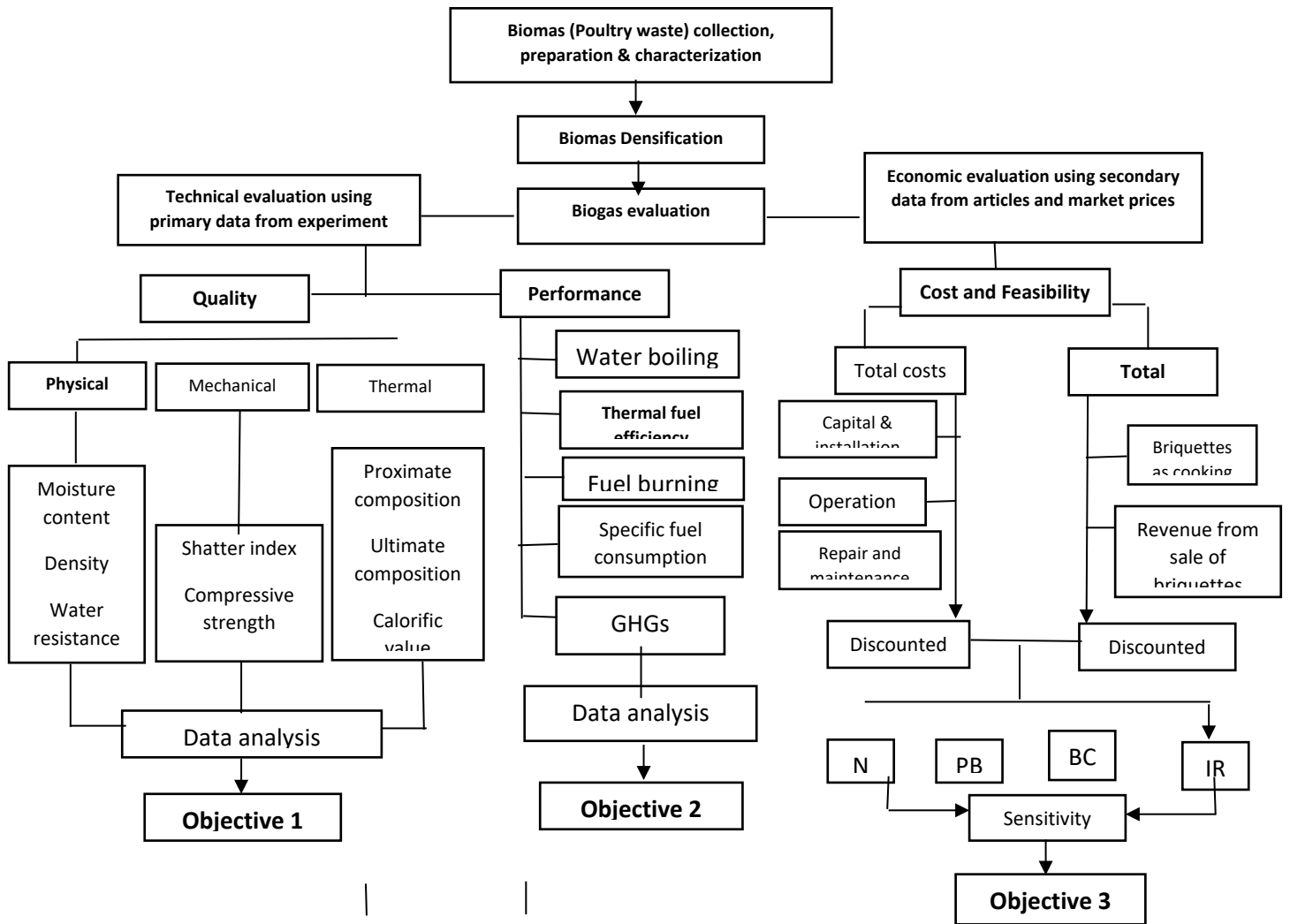


Figure 3.1: Framework for evaluation of technical and economic viability of biogas in Nigeria.

3.3.2 Calculations for Proposed Digester Volume

The research conducted by Alfa et al. (2014) focused on investigating the potential for biogas production from poultry droppings through the process of anaerobic digestion. In their study, the researchers were able to produce a total of 211 liters of biogas from an initial substrate of 6 kilograms of poultry droppings. The recorded standard deviation of 4.84 liters signifies the variation in biogas production results among different experimental runs, indicating the degree of uncertainty associated with the measurements.

To facilitate the anaerobic digestion process, the researchers adopted a specific approach. They first subjected the substrate to a pre-fermentation step, during which the poultry droppings were mixed with water in a 1:1 volume-to-volume (v/v) ratio. This mixture formed a slurry, which is a homogeneous blend of solid and liquid components. The primary objective of this pre-fermentation stage was likely to initiate the breakdown of organic matter and prepare the substrate for efficient digestion.

The anaerobic digestion phase spanned a period of 30 days. Throughout this duration, the pre-fermented substrate was kept in an oxygen-free environment to encourage the growth and activity of anaerobic microorganisms. These microorganisms are responsible for breaking down the organic components of the poultry droppings, resulting in the production of biogas. The composition of biogas typically comprises methane (CH₄) and carbon dioxide (CO₂), with trace amounts of other gases like hydrogen sulfide (H₂S).

In the context of this thesis, the aim is to build upon the insights gained from the research by Alfa et al. (2014). The thesis seeks to explore the potential for biogas production from poultry droppings in a manner that optimizes the process based on previous findings. Specifically, the research conducted by Adelekan and Bamgboye (2009) indicated that a water-to-feedstock ratio of 3:1 led to increased biogas yield from poultry waste. In this context, the Ph.D. thesis aims to digest a larger quantity of poultry droppings, approximately 10 kilograms, with a water-to-feedstock ratio of 3:1.

The decision to use a higher water-to-feedstock ratio is grounded in the findings of Adelekan and Bamgboye (2009), which suggested that such a ratio led to enhanced biogas production. By replicating and building upon their findings, the Ph.D. thesis aims to contribute to the understanding of optimal conditions for biogas generation from poultry droppings. This research has the potential to offer valuable insights into sustainable waste management practices and renewable energy generation.

Based on the Finding, a vessel to digest 10kg of Poultry dropping leaving a total of 30% head space will have a volume which is minimum:

$$= 3:1 \text{ i.e } x:10\text{kg}$$

$$\text{if } x=3*10 \text{ therefore } 30\text{L}:10\text{kg} = \text{total of } 40\text{L space}$$

$$30\% \text{ head space} = 40*0.3= 12\text{L}$$

This implies the vessel must at least be up to $40+12(L) = 52L$ to ensure appropriate digestions, however since these materials are being sourced from local market not specifically fabricated, a vessel with a higher volume can be adopted

3.3.3. Material selection

The selection of construction materials for the biodigester hinges upon a triad of critical factors: availability, cost, and research feasibility, collectively determining the foundation of the biodigester's functionality and longevity. Material availability emphasizes local sourcing to minimize ecological strain, bolstering resource efficiency and community engagement. Cost-effectiveness ensures materials align with the budget while maintaining superior performance, striking a balance for economic viability and extended impact. Research feasibility mandates non-reactive and durable materials, rigorously tested for compatibility with operational parameters and waste types, safeguarding against degradation and ensuring efficacy. This holistic approach harmonizes availability, cost, and research feasibility, with an emphasis on non-reactive and durable attributes that enhance reliability, safety, and ecological significance. The symbiotic relationship between sustainable material choices and the biodigester's overall success is underscored, encapsulating a strategy that optimizes both functionality and sustainability.

Availability	Cost-effectiveness	Research feasibility
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3.3.4. List of locally sourced materials

- 1 70 litre drums with lids
- 2 63 diameter pipes
- 3 63 diameters back nuts
- 4 63 diameters by 1/2 adaptor & plugs
- 5 63 diameter ball gauge
- 6 1/2-inch unions
- 7 1/2-inch reducer
- 8 1/2-inch pipes
- 9 1/2-inch clips
- 10 5/16-inch hose and clips
- 11 Brass nozzles
- 12 Brass ballgames
- 13 3/8 steal valves
- 14 Iron fillings
- 15 Activated lints/activated carbon/silica gel
- 16 Adhesives in ranges / rubber Adhesives / lubricants
- 17 Tefflons
- 18 Suitable Neoprene
- 19 Spray Paint

20 Retrofitted Tyre Tubes (size 16)

Note: all the materials were bought in triplicates, because the experiment will be conducted in triplicate to ensure accuracy of results



Fig 3.3: Materials Used

3.4.0. Tools used

- 1 Measuring Tools: Including tape measures, rulers, and levels for accurate dimensions and leveling.
- 2 Cutting Tools: Such as saws, angle grinders, or cutting torches for shaping and cutting materials like steel or pipes.
- 3 Drilling Equipment: Including drills and bits for creating holes in various materials.
- 4 Screwdrivers and Wrenches: For assembly and fastening of different components.
- 5 Piping and Plumbing Tools: Including pipe cutters, pipe wrenches, and plumbing sealants for setting up inlet and outlet pipes.
- 6 Safety Gear: Such as gloves, safety goggles, helmets, and protective clothing to ensure the safety of workers.

3.5.0 Fabrication

3.5.1 Digester Tank

The process of constructing the biodigester involves several meticulous steps to ensure its functionality and integrity. A 70L container serves as the basis for the biodigester, initially inspected for potential leakages and thoroughly cleaned. The container, measuring 30x30x77cm and featuring a round lid, forms the core structure.

To facilitate the anaerobic digestion process, two holes are meticulously created in the top of the digester. These holes, designed as feedstock inlets, are generated by boring into the digester's top using a 63cm drill bit. Subsequently, a 63-diameter pipe, measuring 45cm in length, is prepared to

serve as the inlet pipe. This pipe is attached to a connectable segment of a 63-diameter back nut. The back nut, when affixed to the front side of the lid, is securely connected and sealed using appropriate adhesives. This establishes a reliable connection between the inlet pipe and the biodigester lid.

Conversely, the outlet for generated gas comprises a smaller orifice with a diameter of 3/8. A 13.3/8 steel valve is threaded into the drilled hole, and a plastic union secures the outlet to the lid. To ensure a hermetic seal, the connection is sealed using adhesive materials.

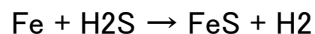
Mirroring the methodology applied for the feedstock inlet, a corresponding outlet for the digestate is established. This entails utilizing a 63-diameter ball gauge, which is connected and integrated following a similar principle. However, the outlet is located 12cm above the base of the digester.



Fig 3.4.1: Digester Tank

3.5.2. Scrubber

The scrubber system comprises a 1-inch pipe with a height of 40cm. Within this system, a combination of iron fillings and cotton materials is employed. The iron fillings play a crucial role in eliminating hydrogen sulfide (H₂S) through a chemical reaction with the biogas. This reaction is represented as follows:



In this reaction, iron (Fe) reacts with hydrogen sulfide (H₂S) to produce iron sulfide (FeS) and hydrogen gas (H₂).

Concurrently, the cotton materials within the scrubber system are utilized to extract moisture from the biogas. By absorbing moisture, the cotton aids in rendering the biogas flammable and suitable for use as fuel. This dual-action scrubber system contributes significantly to the purification and optimization of the biogas for safe and efficient utilization.



Fig 3.5.2: Scrubber system

3.5.3 Gas collection System

The fundamental principle underpinning the gas collection process involves the retrofitting of a conventional glass test tube with a size of 16. This retrofitting entails incorporating a two-way free-flowing mechanism comprising an inlet and an outlet. The inlet is seamlessly connected to the scrubber system, which serves the purpose of gas purification. On the other hand, the outlet acts as the designated point for igniting the gas generated within the digester.



Fig 3.4.3: Gas collection systems

Pressure Testing

The process of pressurization was achieved by inflating the designated tube within the system. Following successful pressurization, a meticulous verification process ensued. The entire system was securely locked, maintaining the applied pressure. A solution of soap was then employed as an effective means to identify any potential leakages throughout the system.

By systematically applying the soap solution, the research team closely monitored the system's components, connections, and joints for any visible signs of gas escaping. The formation of bubbles, prompted by gas leakage, was vigilantly observed and recorded. This step served as a crucial quality control measure, ensuring the integrity of the gas handling system by promptly identifying and addressing any leaks that could compromise system efficiency or safety.

3.6. Digester Feeding

3.6.1. Sample collection

samples were procured within thoroughly cleaned 20-liter paint buckets. The objective was to accumulate samples amounting to 30 liters. Consequently, two buckets, totaling 40 liters in volume, were transported to the abattoir. The specimens were gathered from a poultry farm situated in the village of WARU within the AMAC region.



8.927088608379329,

Fig 3.5.1: sample collection location

3.5.2. Sample Processing

Sample processing involved the following steps: each collected sample was carefully weighed to ensure a uniform 10kg portion for every one of the three digester units. These samples encompassed a variety of materials including feathers, leather, and plastic. Each 10kg segment was then mixed with 30 liters of water, establishing a well-balanced ratio of 3:1. The resulting mixtures underwent meticulous homogenization to achieve a consistent composition.



Fig 3.6.2: Sample Processing

3.6.3. Digester Feeding

Following the completion of sample processing, the subsequent phase involved the feeding of three individual digesters with a total of 40 liters. This allocation adhered to a specific ratio of 3:1, denoting the proportion of 30 liters of water to 10 liters of substrate material.



Fig 3.6.3: Digester feeding

4.1.0 Introduction

In this study, we present the results of an investigation aimed at understanding the dynamics of gas production within a biodigester system. The experiment involved a meticulously designed process, where temperature readings were collected at specific intervals to establish a comprehensive understanding of gas generation and its correlation with environmental conditions.

Throughout the experiment, temperature data were meticulously gathered at precise time points – 2 PM and 2 AM – each day. These readings were obtained using a digital thermometer, capturing the subtle fluctuations in temperature that occur within the biodigester environment. By meticulously documenting temperature variations, we aimed to unveil potential patterns or trends that could shed light on the interplay between temperature and gas production.

Following the rigorous temperature monitoring process, the study transitioned into gas production measurement. Gas production was quantified within a 24-hour cycle, capturing the accumulation

and release of gases from the biodigester. This involved measuring the volume of gas generated within the system over the specified time frame.

The procedure ensured that each 24-hour cycle's gas production data were systematically recorded. These records included the volume of gas produced and any potential fluctuations observed during the release of gases into the atmosphere. This comprehensive approach aimed to provide a holistic perspective on gas production trends and patterns, uncovering potential relationships between temperature variations and gas generation.

By meticulously gathering temperature readings and quantifying gas production in this manner, the study aimed to offer valuable insights into the complex interplay between environmental conditions and the efficiency of the biodigester system. The results of this investigation have the potential to inform not only our understanding of gas production mechanisms within biodigesters but also broader applications in sustainable energy production and waste management strategies.

4.2.0 Profile of Poultry Waste Management Practice in FCT, Abuja, Nigeria

Poultry wastes can be divided into solid wastes, liquid waste and gas wastes. The solid waste consists mainly of bones, undigested ingesta, hairs and occasionally aborted feti, while the liquids comprise of blood, urine, water, dissolved solids and gut contents. Odors and emissions produce gas wastes. Effluent generated from the abattoir is characterized by the presence of a high concentration of whole blood of slaughtered food birds and suspended particles of semi-digested and undigested feeds within the stomach and intestine of slaughtered and dressed food animals. In Abuja, most of the abattoirs visited managed their wastes in either of the following ways, namely

- Burial methods;
- Controlled incineration methods;
- Composting method;
- Rendering method;
- Blood processing method;
- Anaerobic method;
- Washed into flowing streams method; and
- Transportation method.

Table 5: Below gives vividly the various methods of abattoir wastes management as employed by different poultries visited in Abuja, FCT.

Question I: What are the ways poultry waste is currently been managed in FCT, Abuja, Nigeria?

S/No	ITEM	SA	A	D	SD	MEAN (x)
1	Burial method is the main way of managing poultry waste.	107	115	16	2	3.36
2.	Controlled incineration method is the main way of managing poultry waste.	96	113	26	5.	3.25
3.	Composting is the method of poultry waste Management.	108	99	23	10.	3.77
4.	Rendering is the method of poultry waste management.	72	78	52	38.	2.77
5.	The blood of slaughtered animals are processed as a way of poultry waste management.	80	40	90	30.	2.71
6.	Poultry waste are managed through Anaerobic digestion process.	102	92	33	13.	3.18
7.	The wastes from poultry are washed into a flowing stream/river.	111	120	8	1.	3.42
8.	The wastes from poultry are gathered and transported to a designated waste disposal site.	120	101	17	2.	3.41
	General Mean					3.23

Source: Field Survey (January 2023)

Further explanation and quick check are contained in the diagram below

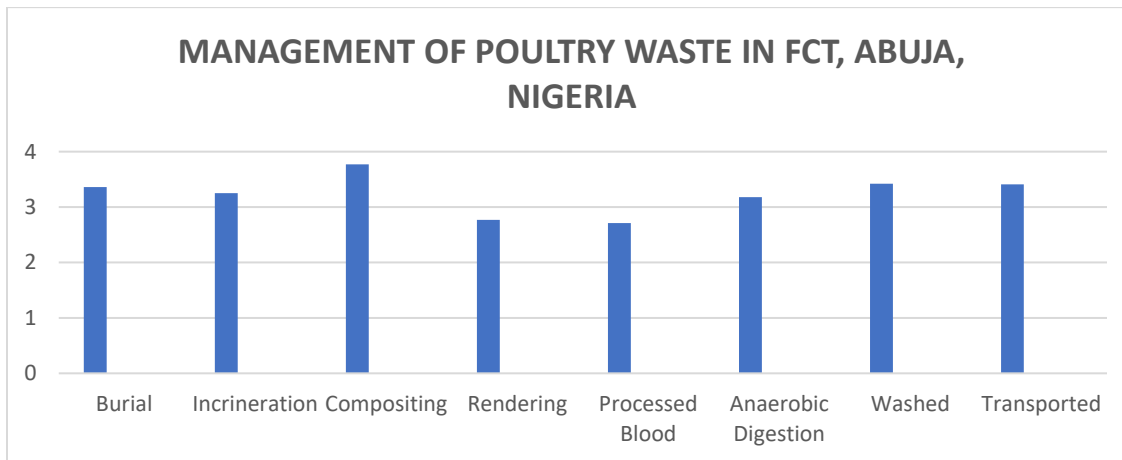


Fig. VI

Source: Table 5

On the average and going by Fig. I above; the commonly used method of waste disposal is the Composting Method and closely followed by the Transportation and Washed into a flowing river/stream method. The choice of these methods is not unconnected to the fact that they easy to use, cheap to maintain and readily available. However, for any chosen method, there is the attendant health implication. Data obtained from research question one is presented on Table 5 and Fig. VI which showed that the entire questionnaire items were agreed with. The minimum and maximum rating means (x) to the items were 2.71 and 3.42 respectively, and a general rating mean of 3.23. It therefore implied that the respondents agreed to the itemised current ways of abattoir management in the FCT, Abuja.

4.3. Gas Measurement

The "16/8-7 inch" notation typically refers to the tire size, where "16" is the outer diameter of the tire in inches, "8" is the section width in inches, and "7" is the inner diameter of the rim in inches. However, this notation doesn't provide enough information to accurately calculate the volume of air that the inner tube can hold, as it doesn't specify the length of the tube or the thickness of the rubber.

To calculate the volume of air the inner tube can hold, you would need the following information:

Inner Diameter: This is the diameter of the hole in the center of the tube that fits around the rim. It's usually slightly smaller than the rim diameter.

Length: This is the length of the inner tube when it's fully inflated and installed in the tire.

Thickness: The thickness of the rubber material of the inner tube, typically measured in millimeters or inches.

With these measurements, you can use the formula for the volume of a cylinder:

$$\text{Volume} = \pi \times (\text{Inner Diameter} / 2)^2 \times \text{Length}$$

4.4. Biogas Data

Table 4.4: Data for 30 days Digestion

DAYS	Temperature (Celsius)	DIGESTER 1 Volume ((L)	DIGESTER 2 Volume ((L)	DIGESTER 3 Volume ((L)
JULY				

1.	28-23	12.9	12.9	11
2.	28-26	12.3	12.6	12
3.	28-23	12.6	12.5	12.5
4.	28-23	12.3	12.2	12
5.	27-23	11.1	11	12
6.	27-22	10.5	10	11
7.	28-22	11.2	11.5	11.7
8.	27-23	10.5	10.7	11
9.	27-21	11.1	11	11.3
10.	27-22	11.6	11	11
11.	28-23	11.3	11.6	11
12.	28-22	11.3	11.6	11.6
13.	27-22	11	11	11
14.	28-23	11.3	11.3	11.9
15.	27-22	10	10	9
16.	27-22	9.5	9.9	9.9
17.	27-22	10.1	10	10

18.	28-24	10.6	10.5	10.9
19.	28-23	10.5	10.4	10.4
20.	28-23	9.3	9.2	10
21.	27-22	8	8	8
22.	28-23	8.5	8.5	8
23.	27-22	8	8	8
24.	28-23	7.5	7.9	7.9
25.	29-21	9.2	8	8
26.	28-23	7.2	7	7
27.	28-22	7.9	7	7
28.	27-22	6.2	6.9	7.2
29.	28-23	7.5	7	7.5
30.	28-23	7	7	7.7
31.	TOTAL	298	300.7	315.5

1.83083

6229

Standard Deviation

Fig 4.4: Daily Production Chart

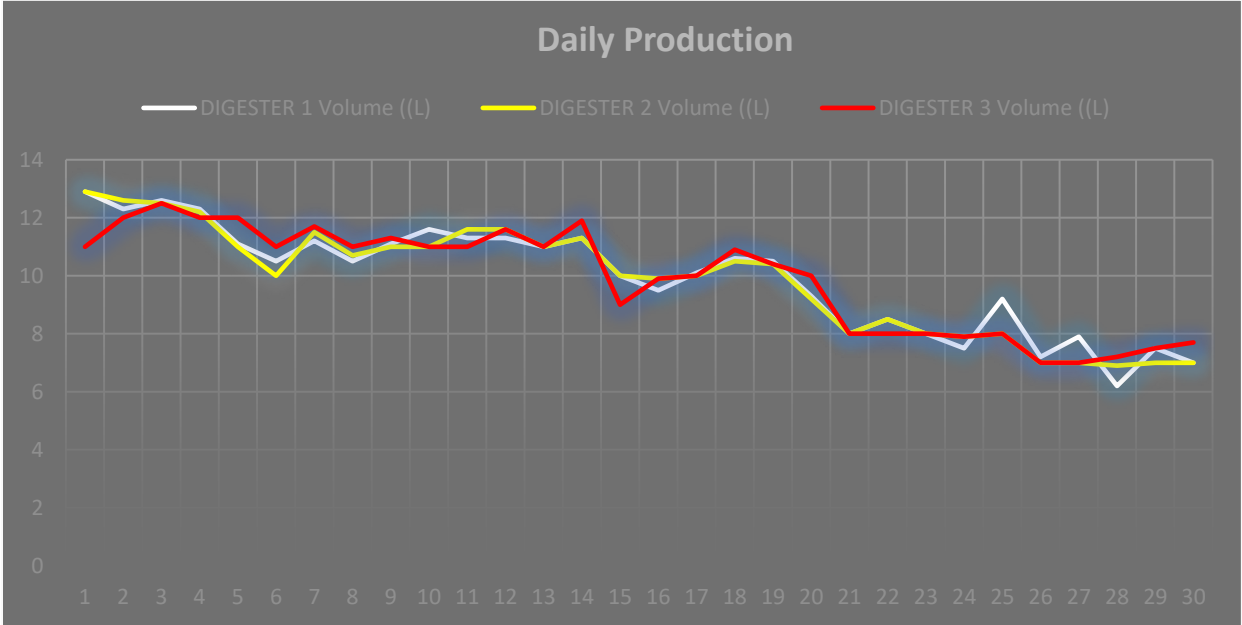


Fig 4.4: Total Gas Production Chart

Total gas production chart



Table 4.4 Average Daily Production over 30 days with Daily Temp Max.

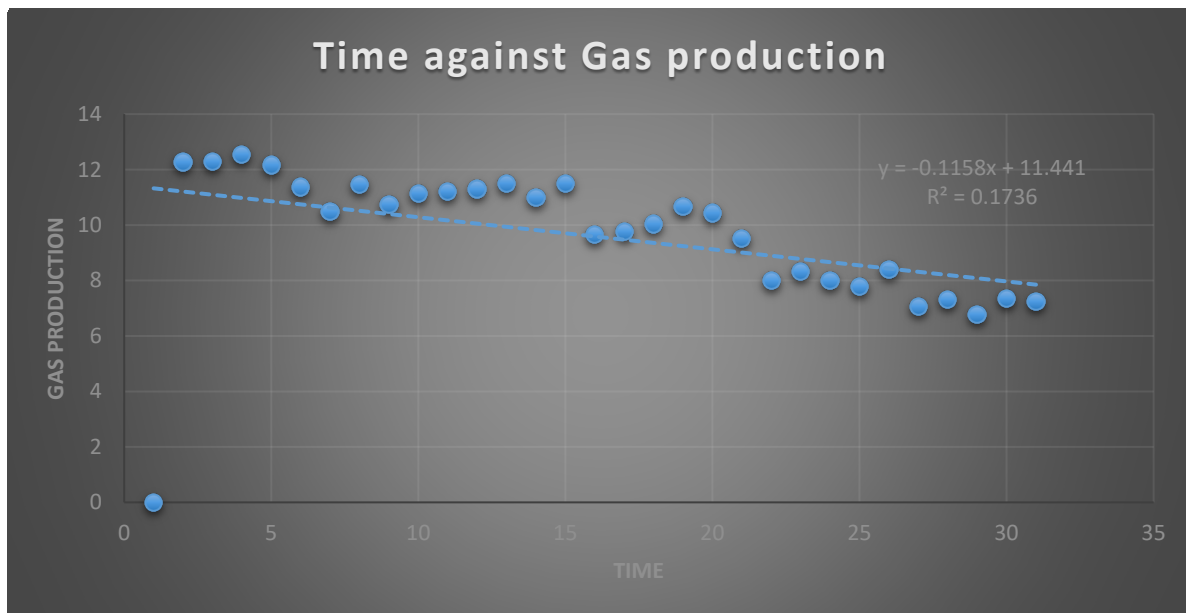
DAYS	Temperature (Celsius)	Gas Volume Average
1.	28	12.3
2.	28	12.3
3.	28	12.5
4.	28	12.2
5.	27	11.4
6.	27	10.5
7.	28	11.5
8.	27	10.7

9.	27	11.1
10.	27	11.2
11.	28	11.3
12.	28	11.5
13.	27	11.0
14.	28	11.5
15.	27	9.7
16.	27	9.8
17.	27	10.0
18.	28	10.7
19.	28	10.4
20.	28	9.5
21.	27	8.0
22.	28	8.3
23.	27	8.0
24.	28	7.8
25.	29	8.4
26.	28	7.1
27.	28	7.3

28.	27	6.8
29.	28	7.3
30.	28	7.2

5.1 Findings

Fig 4.5: Scatter Plot Time against Gas Volume



4.5.1. Regression analysis

SUMMARY	
OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.93569751
R Square	0.87552983

Adjusted R Square	0.871084467
Standard Error	0.654946307
Observations	30

Multiple R (0.9357): The value of 0.9357 indicates a strong positive correlation between the predicted gas production values (based on your regression equation) and the actual observed gas production values. This suggests that as the number of days increases, the gas production in the bioreactor tends to decrease because of the spent organic matter.

R Square (0.8755): The R Square value of 0.8755 means that approximately 87.55% of the variability in gas production over the 30-day period can be explained by the number of days. This indicates that your regression model captures a substantial portion of the variability in gas production using the number of days as the independent variable.

Adjusted R Square (0.8711): The Adjusted R Square value of 0.8711 takes into account the complexity of the model and suggests that even after considering the potential inclusion of unnecessary variables, your model still explains a significant portion of the variability in gas production.

Standard Error (0.6549): The standard error of 0.6549 represents the average distance between your predicted gas production values and the actual observed gas production values. Lower values of standard error indicate that your model's predictions are closer to the actual values, indicating a better fit of the model to the data.

In summary, your regression analysis suggests that there is a strong positive correlation between the number of days and gas production in the bioreactor. The model you've built explains a substantial amount of the variability in gas production, and this relationship holds even when considering the model's complexity. The relatively low standard error indicates that your model's predictions are close to the actual observations.

4.5.2. Combustion capacity

Upon igniting the biogas, distinct flame characteristics were observed, presenting a vivid interplay of colors. Notably, the flame exhibited shades of red and blue, which are indicative of specific combustion properties. While the blue flame might appear faint or barely noticeable in still camera pictures, its presence was strikingly evident during the actual physical combustion of the gas.

The presence of a blue flame is a significant indicator of efficient and complete combustion. Blue flames are associated with higher temperatures and indicate that the combustion process is effectively breaking down the hydrocarbon molecules within the gas. This results in a cleaner and more energy-efficient burn compared to flames dominated by yellow or orange hues.

Despite the challenge of capturing the true intensity of the blue flame through photography, the tests conclusively demonstrated the presence of this characteristic blue flame during the combustion of the natural biogas. The interplay between the red and blue hues in the flame highlights the composition and quality of the biogas, showcasing its potential as a viable energy source.

In practical applications, the presence of a distinct blue flame reinforces the viability of using the natural biogas for various purposes, such as cooking, heating, or generating energy. The visual cues provided by the flame's coloration give valuable insights into the combustion efficiency and the potential energy release from the biogas, further emphasizing its suitability for sustainable energy applications.

4.5.4. Methane content

The gas evolution from the biodigester aligns with Kalsum et al.'s (2020) study on anaerobic digestion of cow dung in a fixed dome biodigester. Their research focused on methane gas quality in this process. They noted a gradual change in gas color, shifting to a deeper blue hue over time.

The bluish gas color arises from changes within the biodigester during anaerobic digestion. Methane, a major biogas component, exhibits this color under specific conditions. While naturally colorless and odorless, methane can appear bluish in larger volumes or concentrations due to its interaction with light.

Kalsum et al. likely linked the deepening blue color to rising methane concentration as anaerobic digestion progresses. Methane's lower density and lightness make it appear bluish in larger volumes. As methane content increases, the blue color intensifies.

This correlation between methane concentration and gas color, seen in Kalsum et al.'s study, provides insights into anaerobic digestion dynamics and biogas composition changes. The bluish transformation indicates methane-rich gas, validating efficient methane extraction through digestion.

In our biodigester system, increasing gas blueness daily signifies enriched methane content. This reaffirms digestion effectiveness, reflecting prior research trends. The visual cue highlights the potential for methane-rich biogas use in renewable energy, aligning with sustainable waste management and energy goals.

Figure 4.5: Methane Increase with time (Kalsum et al, 2020)

Time (day)	Temperature (oC)	pH	CH ₄ (%)
0	26	6,7	0
5	30	6,8	5
10	30	6,9	8,41
15	33	7,0	37,42
20	33	7,0	48,27
25	35	7,1	59,12
30	29	6,9	50,04



Fig 4.5: Gas flaming

Limitations

However, it is important to acknowledge a limitation of this study, which lies in the absence of utilizing a bioanalyzer to directly determine the absolute ratios of methane, carbon dioxide, nitrogen gas, and hydrogen sulfide within the produced biogas. While the visual observations and

flammability tests provided valuable insights into the characteristics of the gas, a bioanalyzer could have offered a more precise and quantitative analysis of the gas composition. Incorporating such advanced analytical tools could have enhanced the accuracy and comprehensiveness of our understanding of biogas composition dynamics and its potential applications. Future studies could consider integrating bioanalyzers to provide a more detailed assessment of the gas composition in biodigester systems.

5.2. Conclusion

In conclusion, this study aimed to investigate the dynamics of gas production within a biodigester system, shedding light on the intricate interplay between environmental conditions and the efficiency of gas generation. Through meticulous data collection and analysis, we examined temperature fluctuations and their potential correlation with gas production.

The experiment involved collecting temperature readings at specific intervals, revealing nuanced temperature changes occurring within the biodigester environment. These variations were documented with precision, allowing us to uncover potential patterns that might influence gas production trends.

Transitioning into the gas production measurement phase, we meticulously quantified gas production over 30-day cycles. The data captured the accumulation and release of gases, contributing to a holistic understanding of gas production patterns. Notably, the flammability tests further illustrated the gas's characteristics, showcasing distinct red and blue flames during combustion.

The regression analysis provided valuable insights into the relationship between the number of days and gas production. The high multiple R-value indicated a strong positive correlation between predicted and observed values, while the R Square value of 0.8755 highlighted that approximately 87.55% of gas production variability could be explained by the number of days. The adjusted R Square value reinforced the model's robustness, considering its complexity.

With a relatively low standard error, the model's predictions closely aligned with actual observations, underscoring the validity of the findings. This comprehensive approach contributes to our understanding of gas production mechanisms within biodigesters, potentially informing broader applications in sustainable energy production and waste management strategies.

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**Non-Peer Reviewed*

The Challenges and Opportunities for PropTech Adoption in Nigeria: an exploration of the factors that influence the adoption and diffusion of proptech innovation in the Nigerian Real Estate industry

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Abstract

This research paper examines the challenges and opportunities for proptech adoption in the Nigerian real estate industry. Proptech, a convergence of property and technology, has the potential to revolutionize the way real estate businesses are conducted by enabling more efficient, quick, and cost-effective operations. However, proptech adoption in developing countries like Nigeria faces unique challenges, including inadequate infrastructure, limited access to finance, and lack of awareness and trust in modern technologies.

This study aims to explore the factors that influence the adoption and diffusion of proptech innovation in Nigeria. A descriptive survey will be used to gather data; a structured questionnaire will be distributed to real estate professionals, proptech companies, and potential users of proptech solutions in Nigeria.

The findings of this study will shed light on the current challenges facing proptech adoption in Nigeria and the opportunities it presents for the real estate industry. The results indicate that about 71% of the respondents are currently using proptech solutions; with increased efficiency, cost reduction, and better decision-making identified as the main benefits. Lack of awareness was cited as the primary reason for not adopting proptech solutions while concerns regarding data privacy and security were noted as potential risks. Factors influencing adoption include ease of use and compatibility with existing systems.

The study's significance lies in providing insights into the state of proptech adoption in Nigeria and identifying key challenges and opportunities. This information will be valuable for real estate managers, developers, investors, brokers, and technology providers, helping them make informed decisions regarding the adoption of proptech solutions. By improving operational efficiency, enhancing customer experience, and driving business growth, proptech adoption can contribute to the growth and development of the Nigerian real estate industry.

Keywords: Proptech; real estate industry; adoption; challenges; opportunities; Nigeria

Introduction

Technology has brought about changes in every sphere of human endeavor. This change has been facilitated in no small way by three activities: information provision, transaction, and effective control (Baum, 2017). The emergence of technology has brought about significant changes in many industries, the real estate sector inclusive.

Before now basic real estate transaction processes like searching for properties to buy, rent or sell used to be done in a traditional way e.g., sharing of properties letting bulletins amongst real estate surveyors. Amongst Architects and Builders, before the introduction of BIM and other Technology based software or applications, paper-based drawings were used to supervise construction works, build, or carry out maintenance works in buildings.

“PropTech,” the abbreviation of “Property Technology,” refers to new companies whose business model connects innovative technological possibilities to the real estate industry (Catella Research, 2016). (“Does PropTech Facilitate Liquidity in the Property Transaction Process?”) PropTech as a form of technology disruption has revolutionized how real estate businesses are conducted, enabling real estate investors, managers, and others to perform their tasks more efficiently, quickly, and at a lower cost.

According to Nikolai, Tom, Sergey, and Ninoslav (2020), PropTech is defined as the massive implementation of emerging technology within the real estate sector. A non-exhaustive list of such technologies includes home matching tools, drones, virtual reality, building information modeling (BIM), data analytics tools, artificial intelligence (AI), Internet of Things (IoT) and blockchain, smart contracts, crowdfunding in the real estate sector, financial technologies (fintech) related to real estate, smart cities and regions, smart homes, and shared economy.

Nigeria, the most populous country in Africa with a population of over 200 million people and an economy that is growing rapidly, presents a significant opportunity for proptech adoption. However, despite this potential, proptech adoption in a developing country like Nigeria faces myriads of challenges, including inadequate infrastructure, limited access to finance, and lack of awareness and trust in modern technology as peculiar to developing countries.

This research paper aims to explore the challenges and opportunities for proptech adoption in Nigeria by examining the factors that influence the adoption and diffusion of proptech innovation in the Nigerian Real Estate industry.

Significance of the study

The significance of this study on the challenges and opportunities for proptech adoption in Nigeria lies in its potential to shed light on the factors that influence the adoption and diffusion of proptech innovation in the Nigerian Real Estate industry.

The findings of this study will be important for various stakeholders, including real estate managers, developers, investors, brokers, and technology providers.

The study will give insights into the current state of proptech adoption in Nigeria, identifying the key challenges and opportunities in this area. This will enable real estate developers and investors to make informed decisions regarding the adoption of proptech solutions, which can improve their operational efficiency, improve customer experience, and drive business growth.

Research Questions

What are the current challenges facing the adoption of proptech innovation in the Nigerian real estate industry?

What opportunities do proptech innovations present for the Nigerian real estate industry?

What are the potential economic and social impacts of proptech adoption in the Nigerian real estate industry?

Literature Review

PropTech

Defined by Baum (2017), PropTech is a set of verticals, including Real Estate FinTech, Shared Economy, and Smart Real Estate, that support information, transaction or marketplace, or management or control. There are three verticals (sub-sectors) and three industry horizontals (drivers), as shown in Table 1.

	Real Estate FinTech	Shared Economy	Smart Real Estate
Information	Yes	Yes	Yes
Transaction/marketplace	Yes	Yes	
Management/control			Yes

Table 1. PropTech verticals and horizontals (Baum, 2017)

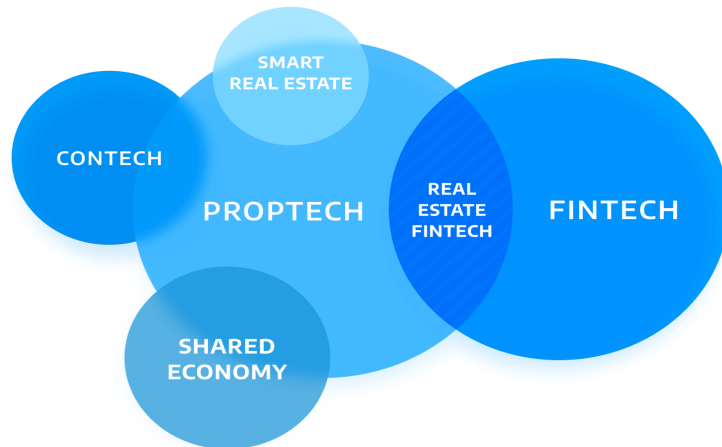
The three sub-sectors in which PropTech is active are driven by construction technology, legal technology, FinTech, the shared economy movement, and exogenous technology (Baum, 2017). The Smart Real Estate sector refers to the technology-based platforms that facilitate the operation and management of real estate assets. This sector primarily supports real estate assets, property, and facilities management. The second sector is the Shared Economy, which describes the technology-based platforms that facilitate the use of real estate assets. The information of potential users and space sellers is provided by the platform simply. Besides, rent- or fee-based transactions may be facilitated or affected directly.

The real estate occupier markets are supported by this sector. Lastly, Real Estate Fintech is the sector that consists of technology-based platforms to facilitate the trading of real estate asset ownership and supports the real estate capital markets. Within this sector, platforms may provide information to potential buyers and sellers, or they may more directly facilitate or influence asset ownership or lease transactions with a negative or positive capital value (Baum, 2020).

“Proptech is one small part of the wider digital transformation of the property industry. It describes a movement driving a mentality change within the real estate industry and its consumers regarding

technology-driven innovation in data assembly, transactions, and the design of buildings and cities” (Andrew Baum and James Dearsley, 2019). (“Disrupting SMB Outbound Marketing, with Sean O’Toole - Yahoo Finanzas”) These innovative technologies are also known as Real Estate Technology, Retech, Realtech, and CRETech depending on which lens you are looking through. However, at its core, proptech always means robust alignment between real estate and technology.

Proptech is the convergence of Fintech, Contech, Smart Real Estate, and Shared Economy



Source: Ascendix Tech

Shared Economy Real Estate – These are proptech platforms that offer shared and/or joint use of a property. AirBnB is the most famous Proptech company driving the shared economy.

Smart Real Estate – This is another prop-tech subsector denoting the use of internet-connected devices and appliances, which are collectively known as the Internet of Things (IoT), to make possible the remote monitoring and management of the house. (“What Is Proptech and How It Changed the Real Estate Industry”)

Fintech (financial technology) – This is part of proptech that brings technology into the financial sector to make customers and businesses access financial services with ease.

Contech (construction technology) – This is the use of modern materials and sustainable approaches in the building process.

This is a general way of classifying the proptech terrain that outlines its basic elements and relationships. It is especially helpful for those just trying to understand what proptech is and how it is associated with other industries.

Two Domains of the Proptech Space: Residential and Commercial Property Technology

The proptech space can be split into two domains according to the end-user – individual residents and businesses.

Residential Property Technology

Residential Property Technology is all the digital products developed by real estate technology companies to facilitate the way people own or rent apartments and houses, e.g., short-term rental platforms, like Airbnb.

The landscape of Residential Property Technology is defined by:

Property Search Platforms (E.g., Nigeria Property Center, PropertyPro etc.)

Financing Tools

Mortgage Lender Software

Real Estate Closing Tools (insurance, transaction management tools)

Property Management Tools (IoT-powered tools)

Loan Management Systems (loan securitization, refinancing, etc.).



Source: Thomvest Ventures Real Estate Tech Review, Fall 2019

CRETech (Commercial Real Estate technology)

CRE-Proptech stands for Commercial Real Estate technology and means the use of all the innovative tools companies and individual CRE professionals use to efficiently manage, search, rent, and sell office, industrial, and retail property assets.

The CRETech space is shaped by:

Property Search Platforms (listing and marketplaces e.g., Nigeria Property Center, PropertyPro etc.)

Constructions Planning and Management Tools (e.g., BIM)

Evaluation and Financing Tools

Property Management Tools (IoT-powered tools)

Asset Utilization (co-working & co-living spaces management, retail, and industrial buildings management, etc.)



Source: Thomvest Ventures Real Estate Tech Review, Fall 2019

Commercial Proptech Real Estate Landscape

So, while Residential Proptech is solely focused on smart property solutions for families and individuals, CRETech is all about driving efficiency in commercial property management.

Proptech innovations have been adopted globally and have transformed the real estate industry all over the world in many ways. These innovations have brought about changes in the way properties are developed, managed, leased, and sold. In Nigeria, the real estate industry is gradually adopting proptech innovations, but there are still challenges that are hampering its full adoption. This literature review examines existing literature on the challenges and opportunities for proptech adoption in Nigeria and explores the factors that influence the adoption and diffusion of proptech innovation in the Nigerian real estate industry.

Proptech Adoption in Nigeria: The real estate industry in Nigeria has been characterized by inadequate data, and inefficient processes, which have hindered its growth. Proptech innovations

such as online property portals, virtual property tours, and digital property management platforms have the potential to transform the industry by providing transparency, improving data management, and simplifying processes. However, the adoption of these innovations has been slow due to various challenges.

One of the challenges of proptech adoption in Nigeria is the lack of awareness and knowledge of the advantages of proptech. According to Olanipekun and Akinmoladun (2020), many real estate professionals in Nigeria are not aware of proptech innovations, and those who are aware do not fully understand their benefits. This lack of awareness and knowledge has led to a reluctance to adopt proptech innovations.

Another challenge is the lack of infrastructure to support proptech innovation. For example, the poor state of the Nigerian power supply has made it difficult for real estate professionals to fully adopt digital property management platforms. According to Akinyemi and Ogunsemi (2019), the lack of a stable power supply in Nigeria has hindered the use of technology in the real estate industry.

Furthermore, the regulatory environment in Nigeria is not conducive to proptech innovation. According to Adigun and Oluwatobi (2020), the absence of clear regulations for proptech innovations has created uncertainty and hindered their adoption. In addition, the excessive cost of compliance with regulations has made it difficult for proptech startups to enter the market.

Methodology

Research Design:

The research design for this study is a descriptive survey design and interviews with decision-makers in top positions at Proptech companies, these will explore the factors that influence the adoption and diffusion of proptech innovation in the Nigerian Real Estate industry. The questionnaire design will allow for the collection of data that can be used to identify patterns and trends in the adoption and diffusion of proptech innovation in the industry.

Sampling Technique and Sample Size:

The target population for this study are real estate professionals, proptech companies, and potential users of proptech solutions in Nigeria. A non-probability purposive sampling technique will be used to select the sample for the study. The sample size for the study will be 75 respondents.

Data Collection Method:

The data for this study is collected using a structured questionnaire. The questionnaire will consist of closed-ended questions that will be used to collect quantitative data from the participants. The questionnaire will be distributed using social media platforms, professional networking sites, and email lists of real estate associations.

Data Analysis Technique:

The data collected for this study will be analyzed using quantitative methods. Descriptive statistics such as mean, standard deviation, frequency, and percentage will be used to analyze the data. Inferential statistics such as regression analysis will be used to examine the relationship between the independent variables (factors that influence the adoption and diffusion of proptech innovation) and the dependent variable (proptech adoption in the Nigerian real estate industry).

In conclusion, this methodology outlines the research design, sampling technique, and sample size, data collection method, and data analysis technique that will be used in the study on the challenges and opportunities for proptech adoption in Nigeria. The use of a descriptive survey research design, non-probability purposive sampling technique, structured questionnaire, and quantitative data analysis technique will enable the researcher to explore the factors that influence the adoption and diffusion of proptech innovation in the Nigerian real estate industry.

Results and Discussion

This section presents the results and discussions of the study on the challenges and opportunities for proptech adoption in Nigeria. The questionnaire was electronically shared with 75 respondents, and 48 respondents filled out the questionnaire. The findings shed light on the factors influencing the adoption and diffusion of proptech innovation in the Nigerian real estate industry.

Proptech Adoption: The survey revealed that 70.6% of the respondents are currently using proptech solutions in their real estate transactions, while 29.4% are not utilizing any proptech solutions.

Benefits of Proptech Solutions: Among the respondents who use proptech solutions, 29.4% reported increased efficiency as a benefit, 11.8% mentioned cost reduction, and 20.6% highlighted better decision-making. It is worth noting that a sizable portion of respondents did not select any specific benefit.

Reasons for Not Using Proptech Solutions: Among the respondents who are not using proptech solutions, the majority (70.6%) cited a lack of awareness as the primary reason. Trust issues were mentioned by 2.9% of the respondents.

Factors Influencing Adoption: When asked about the factors influencing their decision to adopt proptech solutions, 52.9% of the respondents highlighted the ease of use, while 17.6% mentioned compatibility with existing systems.

Potential Risks of Proptech Solutions: In terms of potential risks associated with using proptech solutions in real estate transactions, 44.1% of the respondents' expressed concerns about data privacy, and 23.5% had security concerns.

Experience in the Real Estate Industry: The survey found that 55.9% of the respondents have been in the real estate industry for 6-10 years, 32.4% for 0-5 years, and the remaining respondents have over 16-20 years of experience or more.

Respondent Profile: Among the respondents, 82.4% identified as real estate professionals, 5.9% as builders, and 2.9% worked in a proptech company.

Preferred Proptech Solutions: When asked about the types of proptech solutions they would like to see more of in Nigeria, 32.4% of the respondents chose virtual reality, 29.4% preferred property management solutions, 20.6% expressed interest in smart home technologies, and 17.6% selected property listing platforms.

Proptech Solutions Used in Nigeria: The survey revealed that among the respondents who used proptech solutions in Nigeria, 34.5% utilized property listing platforms, 20.7% employed valuation and appraisal tools, 17.2% made use of online property management tools, 10.3% utilized construction-related solutions, and the rest mentioned digital lending and blockchain-based property transaction tools.

Perceived Benefits of Proptech Solutions: Respondents believed proptech solutions offer the top three benefits in the Nigerian real estate industry ease and increased speed of transactions, easy management of properties, and property accessibility. Other recurring responses included the generation of higher value on properties, ease of marketing, easy access to prospective customers, transparency in transactions, and leverage over the traditional model.

Challenges for Proptech Solutions: The most recurring challenges mentioned by respondents regarding proptech solutions in Nigeria were lack of technical knowledge, poor user experience, slow pace of adoption, limited funds, regulatory hurdles, limited property information, dubious estate agents, limited availability of proptech solutions, poor internet connection, lack of trust, and a lack of awareness.

Challenges Faced by Proptech Solutions: The challenges found by respondents regarding proptech solutions in Nigeria included limited access to the internet and technology, high implementation costs, resistance to change in the industry, awareness, and education gaps, integration with existing real estate systems, lack of government support, government policies and regulations, and trust-related issues.

These findings supply valuable insights into the current state of proptech adoption in Nigeria and the factors influencing its diffusion in the real estate industry. They highlight stakeholders' benefits, challenges, and preferences, which can inform policymakers, industry professionals, and proptech companies in shaping strategies and initiatives to promote proptech adoption and address existing barriers in the Nigerian context.

Conclusion and Recommendations

Summary of Findings

The study investigated the challenges and opportunities for proptech adoption in the Nigerian real estate industry. A questionnaire was distributed to 75 respondents, with 48 respondents providing filled-out responses. The findings highlight the current state of proptech adoption and its influencing factors in Nigeria.

Proptech Adoption: The survey revealed that 70.6% of respondents currently use proptech solutions in their real estate transactions, while 29.4% do not utilize any proptech solutions.

Benefits of Proptech Solutions: Among the proptech users, respondents reported increased efficiency (29.4%), cost reduction (11.8%), and better decision-making (20.6%) as benefits. However, a sizable part did not specify any specific benefit.

Reasons for Not Using Proptech Solutions: The primary reason cited by respondents for not using proptech solutions was a lack of awareness (70.6%), followed by limited technical expertise (14.7%).

Factors Influencing Adoption: Respondents showed that ease of use (52.9%) and compatibility with existing systems (17.6%) were influential factors in their decision to adopt proptech solutions.

Potential Risks of Proptech Solutions: Concerns about data privacy (44.1%) and security (23.5%) were expressed as potential risks associated with using proptech solutions in real estate transactions.

Implications of the Study

The findings suggest that proptech adoption in Nigeria is gaining traction, with a considerable number of respondents already using such solutions. Increased efficiency, cost reduction, and better decision-making are reported benefits. However, a lack of awareness among non-users hinders broader adoption. Data privacy and security concerns need to be addressed to build trust in proptech solutions.

Limitations and Suggestions for Future Research

The study had a small sample size and focused on a specific region. Future research could involve a larger and more diverse sample to obtain a broader perspective. Additionally, qualitative research methods such as interviews or focus groups could supply deeper insights into the challenges and opportunities of proptech adoption in Nigeria.

Recommendations for the Nigerian Real Estate Industry and Proptech Stakeholders:

Increase Awareness: Efforts should be made to educate real estate professionals and stakeholders about the benefits and potential of proptech solutions. Training programs, workshops, and industry events can play a crucial role in enhancing awareness.

Address Trust and Security Concerns: Proptech stakeholders should prioritize data privacy and security measures to alleviate concerns. Building trust through transparency and reliable security protocols can encourage wider adoption.

Enhance Ease of Use: Proptech solutions should be user-friendly and intuitive to ensure easy adoption. Stakeholders should focus on simplifying interfaces and supplying comprehensive user support.

Collaboration and Integration: PropTech companies should collaborate with existing real estate systems to ensure compatibility and integration. This can streamline adoption and maximize the benefits for all stakeholders.

Government Support: Engage policymakers and regulatory bodies to create an enabling environment for proptech innovation. Policies that facilitate data protection, encourage investment, and promote technology adoption can boost the industry.

Focus on Preferred PropTech Solutions: Respondents expressed interest in virtual reality, property management solutions, smart home technologies, and property listing platforms. PropTech stakeholders should prioritize developing and implementing these solutions to meet market demand.

Overall, by addressing awareness gaps, building trust, and focusing on user-friendly solutions, the Nigerian real estate industry and proptech stakeholders can capitalize on the opportunities presented by proptech adoption and drive innovation in the sector.

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Disclosure Statement

This research project was conducted for professional purposes only. The findings are based on collected data and are not intended as professional advice. Participants' anonymity and confidentiality were ensured. The study has limitations due to resource constraints and the researcher's ability. The data reflects information available until April 2023. No conflicts of

interest or external funding influenced the research. The information provided is without warranties or guarantees of accuracy or completeness. Readers should seek professional advice for specific circumstances. By accessing this research, readers acknowledge and accept its limitations.

Notes on Contributor

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**Non-Peer Reviewed*

The Spatial Dimensions of Real Estate Markets: Analysis of Spatial Effects on Rental Values in the CBD Wards of Kisutu, Kivukoni and Mchafukoge in Dar es Salaam

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Abstract

The location of commercial real estate in Central Business Districts (CBDs) is crucial for determining their Property Rental Values (PRV). Real estate economics predicts that properties close to amenities in prime spatial locations command higher PRV. This study focused on three wards in the CBD of Dar es Salaam, Tanzania: Kisutu, Kivukoni, and Mchafukoge. Using a Hedonic model, the research analyzed data by regressing PRV per square meter on property and neighborhood characteristics, while spatial dependence was represented through a dummy variable reflecting enjoyment from spatial amenities offered by the ocean (e.g., proximity to walkable areas/beach, ocean scenic view, quality air/breeze) and proximity to open spaces like a golf playground. The regression results indicated that proximity to walkable areas/beaches and perceived air/breeze quality positively and significantly influenced PRV, leading to USD 1.798 and USD 1.043 higher rent per square meter respectively, for areas enjoying the amenities than those otherwise. However, the presence of an ocean scenic view and proximity to open spaces did not significantly affect PRV. These findings highlight the importance of spatial amenities in contributing to PRV in CBD properties, informing real estate developers, investors, and policymakers in making informed decisions on property development, investment strategies, and promoting sustainable and equitable urban development.

Keywords: commercial real estate; property rental values; central business districts; spatial amenities

Introduction

The equilibrium condition of the real estate market is affected by the location and spatial effects (Yuan, et al., 2020). Researches in real estate rental values takes into account a property's relative location, and its position in relation to other locations since locations interact and can influence one another (Gostautas, 2017). Analyzing a range of real estate properties located in different spatial units provides valuable information which is not available at the aggregate level (Bangura & Lee, 2020). The models for pricing real estate properties involve a variety of factors including spatial characteristics (Morali & Yilmaz, 2020). The property market is unique by nature, as local elements including local schools, markets, hospitals, public infrastructure and demographics are inextricably linked to the rental values of properties inside a given locality (Baum-Snow & Hartley, 2016). An address in a city district, particularly one located inside or outside the CBD, can serve as an indicator of the property's proximity to the city center (Kopczewska & Lewandowska, 2018). The distance to the CBD is therefore considered relevant in determining the property prices in such

a way that Monocentric models illustrate rents and property values decline as the distance to the CBD increases (Meen, 2016).

The Hedonic Pricing Theory (HPT) provides a basic idea that individual neighbourhood specific characteristics and property characteristics each contribute to the overall value of real estate properties (Belke & Keil, 2018). Property rental values therefore give a reflection of hedonic characteristics of the fundamental property but also provide the dynamics associated with neighboring property transactions hence accounting for local dynamics (Milcheva & Zhu, 2020). The presence of spatial effects is also a unique aspect among geographical areas that is considered in deriving property rental values within neighboring cities and suburban areas (Morley, et al., 2018). Spatial effects on rental values can be attributed to both property characteristics and neighbourhood specific characteristics. Spatial amenities such as greenways, open spaces, sea breeze, distance from the beach and scenic spots provide residents with a diversity of ecosystem services beneficial for improving the quality of life (Bucaram & Fernandez, 2019). Due to the limited land supply in high-density cities like Dar es Salam, these spatial amenities are relatively scarce thus, people are more willing to pay a rental premium to live in (Su, et al., 2021).

Space is unique to a property and each property has its unique pricing dynamics that may not be solely influenced by its spatial features (Moralı & Yılmaz, 2020). The characteristics of spatial location are connected to the non-random spatial nature of property rental values. Location rent, which is seen as a premium for prime sites, is a result of the neighborhood's global and local externalities as well as the effects of the relative and absolute location (Kopczewska, et al., 2021). The spatial features that are inherited in property rental values can be addressed in a few different ways. However, when conventional models seek to evaluate commercial property rental values without accounting for spatial dependence, they may fail to accurately represent the extent to which property rental values of different buildings are already correlated (Anselin, 1988; LeSage & Pace, 2010). This may be the case as to why some properties located in the CBDs have similar rental values despite the difference in their proximity to the ocean and open space amenities which do not reflect their prime spatial location. Thus, the impact of spatial features on property rental values in CBDs remains unclear. This raises important questions about the role that spatial factors and amenities play in influencing property rental values in the real estate market within the CBD. Understanding the role of spatial factors and amenities becomes pivotal in comprehending their influence on property rental values within prime locations.

This paper is structured into five sections. The first section has introduced the subject matter of the paper. The second section discusses the study's key variables using existing literature. In the third part, the method of study is presented. The fourth section includes the findings and results of the study, while the last section presents concluding remarks.

Previous Studies on the impact of Spatial amenities on Property Rental Values

In past research on housing markets, researchers have used various methods to determine the values which are associated with specific attributes that make a property more desirable. One crucial set of variables considered in these studies is related to spatial amenities being ocean scenic view, quality air/breeze, proximity to walkable areas/beach and proximity to open spaces.

In a study conducted Bourassa, Hamelink, Hoesli, & MacGregor (1999), they examined the impact of different types and qualities of views on residential property values in Bellingham, Washington using hedonic price model. The regression results of the particular study showed that a full ocean view adds about 60% to market price relative to a similar house with no views and the impact of water views on property values varies inversely with the distance to water. Seiler, Seiler, & Bond (2002) conducted a study which examines the impact of water views on property values. They estimated that a house with a view of Lake Erie has 56% higher value than a house with no view of the Lake. Jim and Chen (2007) investigated property buyers' preferences in relation to spatial/environmental amenities and also assessed the monetary values attributed to spatial amenities by using an HPM. The study discovered that the view of green space had the most significant positive influence on house prices in the study area. Furthermore, the study revealed that individuals demonstrated a willingness to pay a premium amount to enjoy the convenience of having easy access to water bodies located within a 500-meter radius of their property location. Simons and Saginor (2006) examined how environmental amenities can influence property values. They employed regression analyses to assess the impact of contamination and amenity variables on property values. The amenities considered included beach frontage, water views, parks, golf courses, and new housing construction. The researchers discovered that the distribution of positive amenities was not as widespread as that of negative amenities, indicating that certain regions were rich in amenities while others lacked them. Moreover, the study revealed that proximity to these positive features had a positive effect on property prices rather than a negative one.

Paterson and Boyle (2002) used a hedonic pricing model to estimate the impact of different types of views on residential property values in Connecticut. They found that the impact of a water view on house price was negative, suggesting that a house with a water view was valued less than a house without a water view, and however this impact was found to be statistically insignificant. They have suggested that the insignificant negative coefficient on visibility of water was due to lack of observations with water views. In New Zealand context, Bourassa, Hoesli, and Sun (2005) investigated the impact of different types and qualities of a view on the sale prices of residential properties in Auckland using a standard hedonic price model. Utilizing GIS data, it was estimated that at the coastline a wide view commands a premium of 59% compared with a premium of 33% for a medium scope of view on average, whereas the premiums were 18% and 13% respectively when 1,000 metres away from the coast. It was also found a 4.6%–13.3% premium for ocean water views in New Zealand, even when views are distant views. A study by Morancho (2003) on the hedonic price function of dwellings, found that there exists an inverse relationship between the price of dwellings and their distance from urban green areas in the city. The study estimated that for every 100m away a dwelling is located from a green area, the housing price decreases by approximately 300,000 pesetas which is approximately 1,800 USD. Henderson and Song (2008) assessed the additional value of various types of open spaces in a residential market using the hedonic pricing model. The research findings revealed that property values tend to rise as the proximity to open spaces increases. Furthermore, the size of nearby open spaces was found to have an impact on property values. The study also found that the value of being adjacent to public open spaces within walking distance, as well as being close to the nearest open space, was particularly significant for properties with smaller private yards.

According to Benson et al. (1998), the amenity of a view is not consistent and can vary depending on the type (such as water view, mountain view, or valley view) and quality (including full view, partial view, or poor partial view). By categorizing views as ocean front, ocean view, partial ocean view, and no view, the researchers found that compared to having no view, having an oceanfront view increases a property's rental value by 147%, an ocean view increases it by 32%, and a partial ocean view increases it by 10%. Landry and Hindsley (2011) studied beach nearing homes in Tybee Island, Georgia and Using spatial lag hedonic pricing regression models concluded that moving away by 100 meters from a quality beach, home values decline by 21%, and it declines 39% if 200 meters away, and 50% if 300 meters away. The quality of beaches is important for fetching higher price premiums. Gopalakrishnan, Smith, Slott, and Murray (2011) studied coastal properties within 550 yards of the ocean in 10 towns in North Carolina using a hedonic pricing model and found an \$8,800 premium for every unit increase in the beach width (in feet) for ocean front homes. Bark, Osgood, Colby and Halper (2011) using hedonic pricing model studied arid Tucson Arizona, conclusion from the regression analysis results provided that green open spaces proximal to the property create a 21.4% premium \$45,729 for houses with greenness in their neighborhood and 8.4% premium \$17,860 for houses with lot-level greenness. Bowman, Thompson, and Colletti (2009) Studied homes in Cedar Rapids, Iowa, using hedonic pricing models and concluded there is a 3.9% (\$8,688) price premium for homes in the subdivision with more conservation features in the subdivision.

All the reviewed studies above share a common finding which highlight the significant influence of spatial amenities on property rental values. Building upon this existing knowledge, this study adds to existing knowledge by examining the influence of spatial amenities on rental values in the CBD wards of Kisutu, Kivukoni, and Mchafukoge in Dar es Salaam. The research highlights the consistent impact of spatial amenities on property rental values in these specific areas.

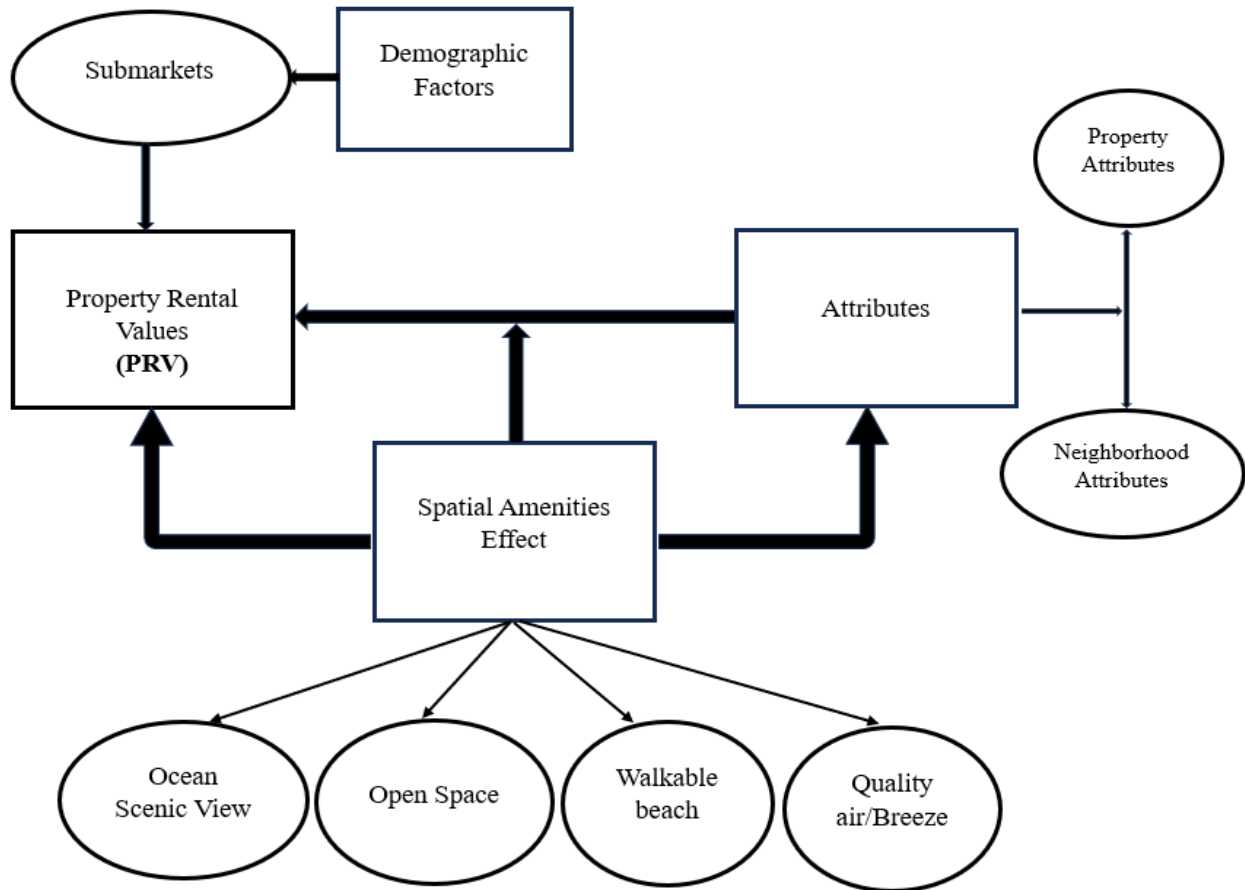


Figure 1: Conceptual framework

Source: Authors Own Construct (2023)

Study Area and Research Methods

The geographical scope of the research was limited to the central business district (CBD) specifically for commercial buildings located in Kisutu, Mchafukoge and Kivukoni areas, located within the Ilala district, surrounded by good spatial amenities such as proximity to ocean, good view, quality air, and open space. Ilala Municipality is situated in the eastern part of the Dar es Salaam region, serving as an administrative district within the region. It spans a geographical area between longitude 39° and 40° east and latitude 6° and 7° south of the equator. As part of Dar es Salaam city, it is positioned in the far eastern corner of the region, with a coastline along the Indian ocean extending approximately 10 kilometers to the east. The municipality comprises 26 wards, including notable ones such as Ukonga, Tabata, Ilala, Buguruni, Jangwani, Kisutu, Mchafukoge, Kivukoni, East and West Upanga, and Kariakoo. These wards contribute to the social fabric and diversity within Ilala Municipality.

Kisutu, Kivukoni, and Mchafukoge wards are specific administrative divisions within the larger Ilala Municipality in the Dar es Salaam Region of Tanzania. Kisutu ward is centrally located and

serves as a significant commercial and administrative hub with vibrant markets and active commercial activities. It shares borders with Upanga east ward and Kivukoni ward to the north and northeast, Mchafukoge ward to the south, and Jangwani ward to the west. The population of Kisutu Ward has been growing, reaching 10,404 individuals in 2016, compared to 8,308 individuals in 2012. Kivukoni ward is situated in the northeastern part of Ilala Municipality near the Indian ocean. Its coastal location, with an area of 2.387 square kilometers, makes it a significant ward in the country. The ward is known for its "crossing place" (Kivukoni) due to its proximity to the ocean. It shares borders with Upanga East ward to the west, Kisutu ward to the southwest, and Kigamboni ward across the Kivukoni channel. Kivukoni Ward is home to the Ikulu, the official residence of the President of Tanzania, as well as the National Museum of Tanzania. The 2012 census recorded a total population of 6,742 individuals in Kivukoni ward. Mchafukoge ward serves as the district capital within the Ilala district of Dar es Salaam region. It is located in the southwestern part of the Ilala Municipality, offering a mix of residential and commercial areas. The ward shares borders with Kisutu and Kivukoni wards to the north, the Dar es Salaam Harbor to the east, Kurasini and Keko wards to the south, and Kariakoo and Jangwani wards to the west. With its dynamic nature, Mchafukoge Ward has seen a population increase, reaching 13,384 individuals in 2016 compared to 10,688 individuals in 2012.

This study employed a quantitative approach and utilized the survey method to investigate the behaviors of properties and households in the Kisutu, Mchafukoge, and Kivukoni areas within the Ilala Municipality. Data collection involved households and property managers, with the main research instrument being a structured questionnaire. The sample selection followed a two-stage sampling technique, where geographically defined clusters were randomly chosen, and individual sampling units were then selected by random sampling to achieve a two-stage cluster study (Famuyiwa, 2018). The sample size of 120 properties was considered, allowing for a representative of the real estate market in the study areas and providing data for meaningful analysis.

The sample encompassed various types of properties, such as residential, mixed-use, and commercial properties, ensuring a diverse representation of the market. A total of 130 questionnaire was administered but because of different challenges from the respondents, only 120 questionnaires were received back, 27 for Kisutu, 43 for Kivukoni and 50 for Mchafukoge which were later analyzed to provide the results of the study.

The collected data was subjected to both descriptive and inferential statistical analyses. The hedonic pricing model (HPM) model was utilized to discern meaningful value inferences pertaining to the variables considered in the study. The hedonic pricing model describes the functional relationship that exists between property rental value as well as associated relationships that exists between physical characteristics and neighbourhood characteristics (Sirmans, et al., 2005).

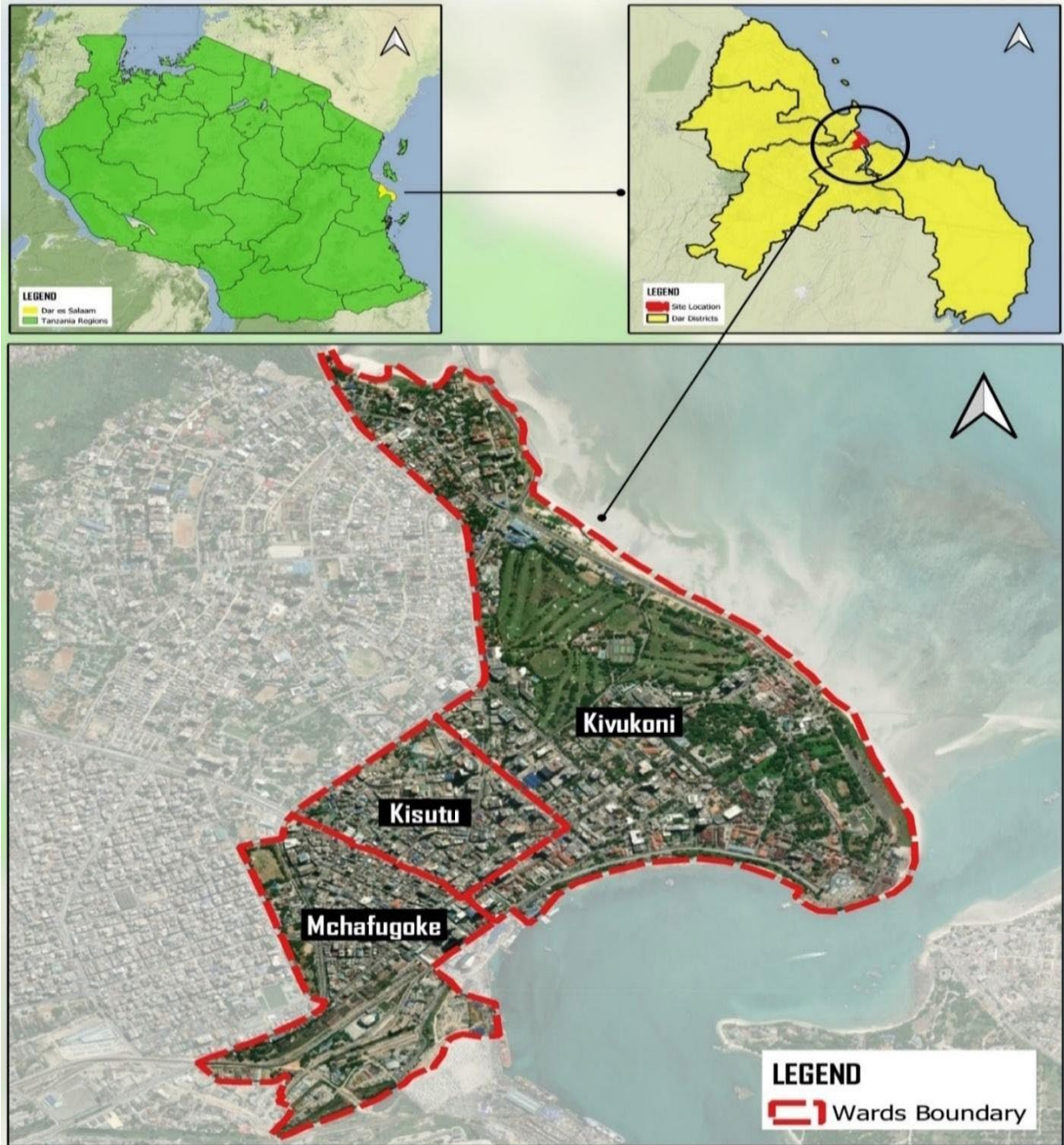


Figure 2: Study Area – Kivukoni, Mchafugoke and Kisutu, Ilala, Dar es Salaam, Tanzania

The analysis of the data collected from the tenants was done using multiple regression model to determine the interrelationships between (Independent Variables) Property attributes (Chau, et al., 2001), house hold characteristics property attributes (Chau, et al., 2001), house hold characteristics (Lim & Lee, 2013), neighborhood attributes (Abidoeye & Chan, 2016), and the presence of specific spatial amenities (Simons & Saginor, 2006), which have a significant effect on property rental values (dependent variable). The model is not only capable of handling the problem of interactions amongst the independent variables but also it enables us to know the contributions or the

importance of each variable to the explanation of variation in the dependent variable (Property rental value). It also allows for the prediction of value of the dependent variable.

According to (Olujimi & Bello , 2009), Property rental values (dependent variable) is considered as a function of various factors. This can be presented in a formula for a multiple linear regression as:

$$Y = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n + \epsilon \dots \dots \dots \text{equation (1)}$$

Whereby,

Y= Predicted value of dependent variable

β_0 = The y-intercept (value of y when all parameters are set to 0)

$\beta_1 X_1$ = Regression coefficient (B_1) of the first independent variable (X_1)

$\beta_n X_n$ = The regression coefficient of the last independent variable

ϵ = Model error

For the case of this stud, the model can be termed as below

$$R = f(PA, PNA, SD, PNA * SD, PA * SD) \dots \dots \dots \text{equation (2)}$$

However, the application of the model to our case study depicts the rent function to be theoretically formulated as;

$$R_i = \beta_0 + \beta_{1i} \sum_{i=1}^6 PA + \beta_{2i} \sum_{i=1}^{11} PNA_i + \beta_{3i} \sum_{i=1}^4 SD_i + \beta_{4i} \sum_{i=1}^1 SD_i * PNA_i + \beta_{5i} \sum_{i=1}^1 SD_i * PA_i + E_i \dots \dots \dots \text{equation (3)}$$

This is estimated as

$$R_i = \hat{\beta}_0 + \hat{\beta}_{1i} \sum_{i=1}^6 PA + \hat{\beta}_{2i} \sum_{i=1}^{11} PNA_i + \hat{\beta}_{3i} \sum_{i=1}^4 SD_i + \hat{\beta}_{4i} \sum_{i=1}^1 SD_i * PNA_i + \hat{\beta}_{5i} \sum_{i=1}^1 SD_i * PA_i \dots \dots \dots \text{equation (4)}$$

Where,

PNA= Property Neighborhood Attributes

PA= Property Attributes

PNA=Property Neighborhood Attributes

SD= Spatial dependence/Spatial amenities attributes

3.1 Description of Regression variables

This part enlists and describes the variables related to the study, the abbreviation of those variables and description based on each variable.

Table 1. Description of property attributes variables

Property Attributes			
S/n	Variable Name	Description	Abbreviation
1	Parking Space	Parking available = 1, Otherwise = 0	PS
2	Number of floors	Number	NF
3	Toilets	Number	TLS
4	Bathrooms	Number	BRM
5	Security systems (Cameras, Alarm system)	Security systems present = 1, Otherwise = 0	SCS
6	Lifts/Elevators	Lifts present = 1, Otherwise = 0	LE
7	Wi-Fi hotspot	Wi-Fi available = 1, Otherwise = 0	WH
8	Swimming pool	Property has swimming pool (1=Yes, 0 =No)	SP
9	Sewage disposal	Sewage disposal present (1=Yes, 0= No)	SD
10	Garden	Property has Garden (1=Yes, 0= No)	GDN
11	Property management service	Management present (1=Yes, 0=No)	PMS
12	Wall fences	Has wall fence (1=Yes, 0=No)	WF
13	Heaters	Has heater (1=Yes, 0=No)	HT
14	Cooling systems (Fans and ACs)	Has cooling systems (1=Yes, 0=No)	CS
15	Automatic Standby generators	Has generator (1=Yes, 0=No)	ASG
16	Availability of electricity	Has electricity (1=Yes, 0=No)	ELT
17	Availability of water services	Has Water (1=Yes, 0=No)	WTS

The table 1 provides a list of property attributes along with their corresponding measurement scales and abbreviations. These attributes represent various features and amenities that can be found in properties. These attributes provide information about various aspects of a property's amenities, facilities, and services, which can influence its desirability and potentially impact rental values.

Table 2. Description of property neighborhood attributes variables

Neighborhood Attributes			
S/n	Variable Name	Description	Abbreviation
1	Security services	Has Security service (1=Yes, 0=No)	SVS
2	Quietness and Privacy	Has Privacy (1=Yes, 0=No)	QP
3	Accessibility to major roads	Has access to road (1=Yes, 0=No)	MJR
4	Restaurants/Hotels	Restaurants nearby (1=Yes, 0=No)	RST
5	Hospital	Proximity to nearby hospital (1=Yes, 0=No)	HOSP
6	Banks	Access to banks nearby (1=Yes, 0=No)	BNK
7	Educational facilities (Universities, Colleges, Schools)	Access to Education facilities (1=Yes, 0=No)	EDU
8	Markets/Shopping centres	Markets nearby (1=Yes, 0=No)	SHP
9	Police station	Police station nearby (1=Yes, 0=No)	PLS
10	Fire station	Fire station nearby (1=Yes, 0=No)	FST

The table 2. provides a list of neighborhood attributes and their corresponding measurement scales and abbreviations. These attributes are factors that can influence the desirability and quality of a neighborhood. These neighborhood attributes provide important insights into the amenities and

services available in a particular neighborhood, which can influence the desirability and rental values of properties in the area.

Table 3. Description of household attributes variables

Household Characteristics			
S/n	Variable Name	Description	Abbreviation
1	Age of household	Number (In Years)	AG
2	Income level	Exact amount in TZS and US\$ (Scale)	INC
3	Nationality	Exact response (Nominal)	NTN
4	Expenditure level	Exact amount in TZS (Scale)	EXP
5	Gender	Dummy (1=Male, 0=Female)	GEN
6	Employment status	Dummy (1=Employed, 0=Unemployed)	EMP
7	Education level category	Primary education is 1, secondary 2, 3 Diploma and 4 is higher education, (Ordinal)	EDL
8	Marital status	Single 1, Married 2 and otherwise 3, (Nominal)	MRS
9	Household occupation	Business 1, Employee 2 and otherwise 3, (Nominal)	OCC

The table 3. provides a list of household characteristics variables and their corresponding measurement scales and abbreviations. These household characteristics variables provide valuable information about the demographic, economic, and social aspects of the households under study. They can be used to analyze and understand the relationships between these variables and other factors of interest in the research or study.

Table 4. Description of spatial amenities variables

Spatial amenities features			
S/n	Variable Name	Description	Abbreviation
1	Scenic view	Access to scenic view (1=Yes, 0=No)	SCV
2	Wind (Ocean breeze)	Enjoy wind from the ocean (1=Yes, 0=No)	WIN
3	Open space	Proximity to open space (1=Yes, 0=No)	OPS
4	Walking ground (Ocean beach)	Proximity to ocean beach (1=Yes, 0=No)	WGR
5.	Spatial amenities and Property characteristics interaction	Interaction effect between spatial amenities and property characteristics	SPPC
6.	Spatial amenities and Property neighborhood characteristics interaction	Interaction effect between spatial amenities and property neighborhood characteristics	SPNC

The table 4. provides a list of spatial amenity features and their corresponding measurement scales and abbreviations. These spatial amenity features highlight specific attributes of the property's surroundings that can contribute to its desirability and potentially impact rental values.

Rental values trend in Dar es Salaam CBD

Real Estate in Dar es Salaam, Tanzania’s commercial capital and Africa’s fastest growing city, has a current population of about 4.3 million which is expected to rise about 20 million by 2050 (Nyangarika, 2020). It comprises of 35% of all households in Tanzania that are urban, over one-third (35 percent) reside in Dar es Salaam (approximately 2.7 million people, or 1.5 million households) (Gardner, et al., 2020). Real estate sector in Dar es Salaam has attractive rental yields with average yields of 5.2%, 6.4% and 9.3% for residential, office and retail sectors, respectively while a larger percentage of yield is derived along properties located in the CBD (Cytonn, 2018). Within Dar es Salaam, the high-end market comprises of developments CBD areas including Kisutu, Upanga, Kivukoni and other areas where this sector, detached units have the highest yields at 7.8% as they are relatively lower in supply thus able to charge rental premium due to the relatively low supply given the increasing land prices in their locations and available spatial amenities such as sea breeze, water view, open spaces and golf courses (Cytonn, 2018). The proximity and easy access to amenities such as leisure and recreational activities or scenic views lead to higher demand for properties in those locations, resulting in increased PRV in the surrounding areas. This creates a spatially clustered market, where investors and tenants who seek these amenities benefit the most from properties located on the edges of these amenities (Mittal & Byahut, 2016).

4.1 Descriptive statistics for the case study

In Table 5. the descriptive statistics of the sampled properties in the study area are displayed.

Table 5. Descriptive statistics summary for dependent variable and independent variables

Variable	Description	N	Min	Max	Mean	Std. Dev
DEPENDENT VARIABLE						
	Rent Per Sqm	120	8.0	18.0	13.50	2.1420
INDEPENDENT VARIABLES						
Gender	Male	120	0	1	.58	.495
	Female	120	0	1	.42	.495
Nationality	Tanzanian	120	0	1	.53	.501
	Other	120	0	1	.47	.501
Marital status	Single	120	0	1	.02	.129
	Married	120	0	1	.79	.408
	Widow/Widower	120	0	1	.18	.382
	Divorced	120	0	1	.02	.129
Age	Age 18-35	120	0	1	.13	.332
	Age 36-45	120	0	1	.50	.502
	Age 46-59	120	0	1	.29	.456
	Age 60-Above	120	0	1	.08	.278
Education Status	Prim Education	120	0	0	.00	.000
	Ordinary Level Education	120	0	1	.06	.235
	Advanced Sec Education	120	0	0	.00	.000
	Diploma	120	0	1	.22	.414
	Bachelor degree	120	0	1	.48	.501
	Masters degree	120	0	1	.24	.430
	PhD	120	0	1	.01	.091
Income	300K-500K	120	0	0	.00	.000

level	510K-1M	120	0	1	.20	.402
	1.1M-1.5M	120	0	1	.20	.402
	1.6M-2.5M	120	0	1	.33	.470
	2.6M-3M	120	0	1	.03	.180
	3.1M-Above	120	0	1	.23	.425
Property type	Office Building	120	0	1	.40	.492
	Retail Building	120	0	1	.17	.374
	Residential Building	120	0	1	.30	.460
	Industry Building	120	0	0	.00	.000
	Mixed Use Building	120	0	1	.13	.341
Occupancy rate	0-20%	120	0	1	.01	.091
	21%-50%	120	0	1	.26	.440
	51%-80%	120	0	1	.38	.488
	81%-100%	120	0	1	.34	.476
Rented area		120	18.00	160.00	50.54	29.69
Neighbourhood characteristics Index		120	.29	1.00	.69	.182
Property Characteristics Index		120	.24	.94	.63	.213
Proximity to Spatial Amenities Index		120	.00	1.00	.67	.285
Neighborhood characteristics*Spatial Amenities Index		120	.00	1.00	.49	.298
Property Characteristics* Spatial Amenities index		120	.00	.94	.44	.269
Valid N (listwise)		119				

The descriptive statistics results indicate that the rent per square meter has a mean value of USD 13.50. This suggests a moderate variability in the rental prices around the average. Demographically, the dataset encompasses a gender distribution of 58% male and 42% female respondents, while 53% of the subjects identify as Tanzanian nationals and 47% as belonging to other nationalities. Marital status profiles a predominant proportion of married participants at 79%. The category of household aged 36-45 years stands out as the most substantial segment, constituting 50% of the sample. The education level demonstrates the prevalence of bachelor's degrees at 48% while income distribution highlights a prominent concentration within the 1.6M-2.5M range, comprising 33% of the data. In terms of property type, the dataset comprises predominantly of office buildings (40%), and a prevailing majority of properties maintain occupancy rates ranging from 51% to 100%.

Regression results

4.2.1 Hedonic regression results

Table 6. Regression coefficients for property characteristics

Coefficients			
Model	Unstandardized Coefficients		Sig.
	B	Std. Error	
(Constant)	6.939	0.862	0.000
Household Characteristics			
Gender category	-0.189	0.167	0.274
Nationality category	0.481	0.151	0.002

Marital Status category	0.252	0.235	0.117
Income category	0.058	0.074	0.436
Job Status category	0.073	0.249	0.771
Property Characteristics			
Parking Space	0.089	0.427	0.834
Good toilets	1.496	0.525	0.005
Good Bathrooms	0.397	0.451	0.004
Security Services	0.246	0.364	0.502
Security Systems	0.881	0.389	0.026
Lifts and Elevators	1.652	0.357	0.001
Water Services	1.022	0.725	0.162
Auto Standby Generator	-0.186	0.400	0.644
Fire alarm & Extinguisher	-0.303	0.413	0.465
Wi-Fi/Hotspot	1.418	0.384	0.001
Sewage disposal	0.078	0.373	0.834
Swimming pool	0.77	0.849	0.367
Garden	-0.064	0.346	0.854
Property management service	0.739	0.340	0.032
Cooling systems	1.242	0.405	0.003
Wall fences	0.742	0.275	0.008

In Table 6 above the regression analysis results indicate that the coefficient for parking space is 0.089, this indicates that for every unit increase in the presence of parking space, there is an expected increase of 0.089 in the rent per square meter, although the coefficient is not statistically significant ($p = 0.834$). The coefficient for good toilets is 1.496. It suggests that properties with better toilet facilities tend to have an expected increase of 1.496 in the rent per square meter ($p = 0.005$). Good Bathrooms, Security Services, Security Systems, Water Services, Auto Standby Generator, Fire Alarm and Extinguisher, Sewage disposal, Swimming pool, Garden, and Cooling systems, the coefficients for these variables indicate their respective impact on the rent per square meter, but none of them are statistically significant as their p-values are greater than 0.05. The coefficient for lifts and elevators is 1.652, indicating that properties with this feature are expected to have an increase of 1.652 in the rent per square meter ($p < 0.001$). The coefficient for Wi-Fi/Hotspot is 1.418, indicating that properties with this feature are expected to have an increase of 1.418 in the rent per square meter ($p < 0.001$). The coefficient for property management service is 0.739. It suggests that properties with property management services tend to have an expected increase of 0.739 in the rent per square meter ($p = 0.032$). The coefficient for wall fences is 0.742, suggesting that properties with wall fences tend to have an expected increase of 0.742 in the rent per square meter ($p = 0.008$). In general, these coefficients provide insights into the relationship between various property characteristics and the rent per square meter. Some features, such as good toilets, lifts and elevators, Wi-Fi/hotspot, and property management services, are found to have statistically significant effects on the rental values, while others do not show significant associations based on the results of analysis.

Table 7. Regression coefficients for neighborhood characteristics

Coefficients			
Model	Unstandardized coefficients		Sig.
	B	Std. Error	
(Constant)	5.294	0.801	0.000
Household characteristics			
Gender category	-0.178	0.165	0.296
Nationality category	0.481	0.151	0.002
Marital status category	0.379	0.231	0.105
Income category	0.058	0.074	0.436
Job status category	0.073	0.249	0.771
Neighborhood characteristics			
Security and safety	1.015	0.217	0.001
Absence of noises	0.837	0.211	0.001
Drainage systems	0.801	0.194	0.001
Accessibility to major roads	1.438	0.732	0.052
Restaurants/hotel	0.494	0.211	0.021
Health facilities	0.668	0.253	0.009
Bank/financial services	0.469	0.310	0.133
Bus stand/Public transport	1.096	0.207	0.001
Educational facilities	1.243	0.255	0.001
Market/Shopping	0.843	0.214	0.001
Local government	0.792	0.221	0.001
Major roads	0.668	0.217	0.003
Police station	0.456	0.194	0.021
a. Dependent variable: Rent per sqm			

The analysis in Table 7. reveals that several independent variables have statistically significant relationships with rental prices. Factors like privacy, security and safety, absence of noises, and drainage system quality have positive impacts on rent, with coefficients of 0.581, 1.015, 0.837, and 0.801, respectively. This means that an increase in these scores leads to estimated rent increases per square meter. Similarly, accessibility to major roads, restaurants/hotels, health facilities, bus stands/public transport, and educational facilities also show significant positive relationships with rental prices, with coefficients of 1.438, 0.494, 0.668, 1.096, and 1.243, respectively. On the other hand, the availability of bank/financial services does not significantly influence rental prices (coefficient of 0.469), and while major roads and police stations have statistically significant coefficients, their impacts are comparatively smaller. Overall, the analysis suggests that privacy, security and safety, absence of noises, drainage systems, and various amenities play significant roles in determining property rental values.

4.2.2 Multiple Regression results

Table 8. Regression coefficients for spatial amenities

Model	Unstandardized Coefficients		Sig.
	B	Std. Error	
(Constant)	4.405	0.758	0.001
Property characteristics	4.268	1.558	0.007
Neighbourhood characteristics	9.032	1.932	0.001
Proximity to walkable area/beach	1.798	0.368	0.001
Ocean scenic view	0.042	0.435	0.092
Quality air/breeze	1.043	0.290	0.027
Proximity to open space	0.754	0.403	0.064

The findings of the study show that proximity to walkable area/beach variable has a coefficient of 1.798, indicating that a one-unit increase in proximity to walkable areas or beaches is associated with an increase of 1.798 units in the rental value per square meter. The standardized coefficient (Beta) of 0.410 suggests that this variable has a relatively strong positive impact on rental values. Ocean scenic view variable has a coefficient of 0.042, which indicates a very small positive effect on rental values. The non-significant p-value (0.923) suggests that the relationship between ocean scenic view and rental values is not statistically significant in this model. Quality air/ ocean breeze variable has a coefficient of 1.043, indicating that a one-unit increase in the perceived quality of air or breeze is associated with an increase of 1.043 units in rental value per square meter.

The standardized coefficient (Beta) of 0.182 suggests a moderate positive impact on rental values. Proximity to Open Space variable has a coefficient of 0.754, indicating that a one-unit increase in proximity to open spaces is associated with an increase of 0.754 units in the rental value per square meter. The p-value (0.064) is close to the significance threshold of 0.05, suggesting a marginally significant relationship with rental values. Based on these regression results it can be concluded in summary that proximity to walkable areas/beaches and perceived quality of air/breeze have positive and statistically significant effects on property rental values. However, the presence of an ocean scenic view and proximity to open spaces have relatively weaker or marginally significant effects on rental values in this model. These findings are consistent with the studies by Simons and Saginor (2006), Jim and Chen (2007), and Cho, Lambert, Kim, Roberts, and Park (2011). These studies emphasized the positive influence of proximity to desirable amenities such as beaches, parks, and open spaces on property values. Also, the findings align with the study by Morancho (2003) which highlighted the negative impact of nearby open spaces on property values.

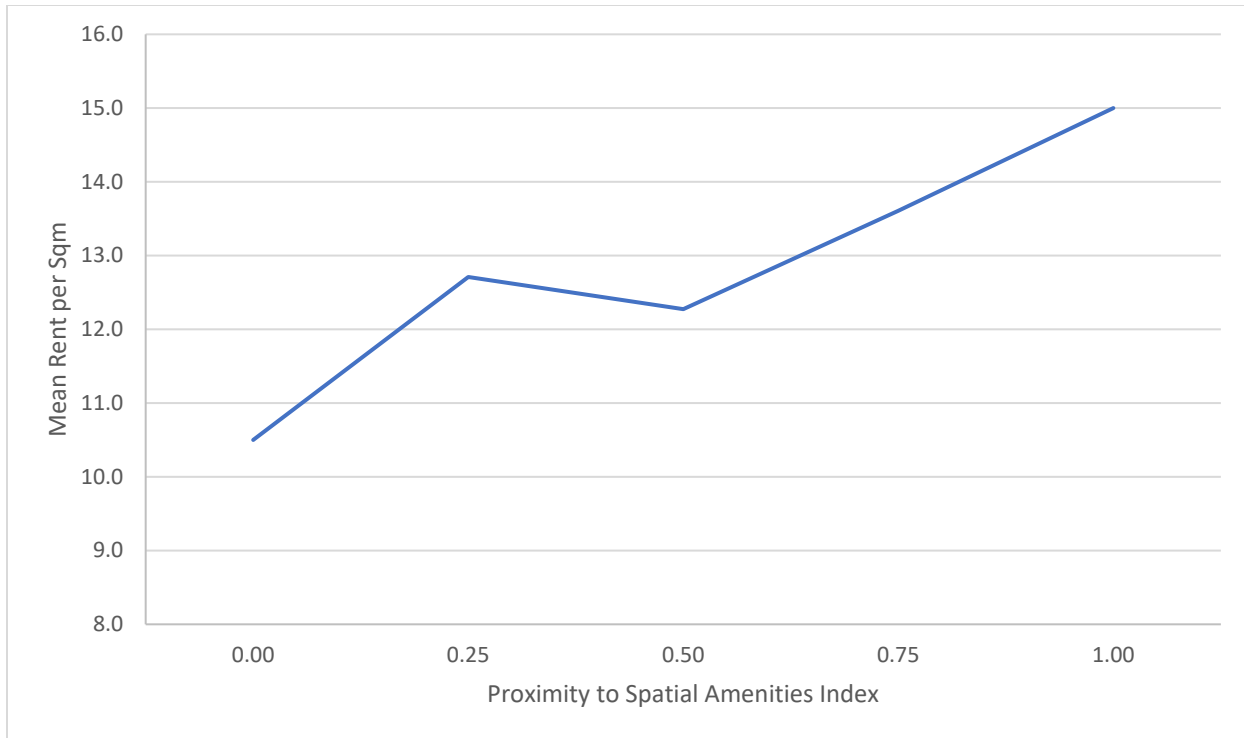


Figure 2. The relationship between spatial amenities effect on property rental values

Source: Authors Own Construct (2023)

Table 9. Regression coefficients for Property characteristics and Spatial amenities interaction

Model	Unstandardized Coefficients		Sig.
	B	Std. Error	
(Constant)	6.384	.346	.001
Property characteristics	3.619	1.550	.021
eighbourhood characteristics	6.664	1.736	.001
Neighborhood characteristics and spatial amenities effect	5.372	.439	.001
Property characteristics and spatial amenities effect	6.052	.473	.001

The regression results indicate two models with the dependent variable "Rent Per Sqm" and two interaction predictor variables. In the first model, the "Property Characteristics* Spatial Amenities effect" has a significant positive effect on rent per square meter (coefficient of 6.052, $p < .001$). This suggests that the combined impact of property characteristics and spatial amenities has a strong influence on rental prices. The standardized coefficient (beta) of 0.762 shows the relative

importance of this predictor in explaining the variation in rent. Similarly, in the second model, the "Property neighborhood characteristics and spatial amenities" interaction also has a significant positive effect on rent per square meter (coefficient of 5.372, $p < .001$).

The standardized coefficient (beta) is 0.748, indicating its relative importance in explaining the variation in rent. Both models highlight the importance of considering the joint effects of property characteristics and spatial amenities in understanding rental prices. An increase in the combined effect of these variables leads to a higher rent per square meter in both cases. These findings align with several studies having explored the individual effects of property characteristics and spatial amenities on rental values. For example, Ozus (2009) found that factors like the number of floors in buildings and the presence of social facilities within the buildings significantly influenced office rents. Sirmans et al. (2005) highlighted the significant effect of bathrooms on property values. Jim and Chen (2007) demonstrated the impact of urban environmental elements on residential rental values. The graphs that illustrate the trends of simple line mean of neighbourhood characteristics and property characteristics interaction with spatial amenities index by rent per sqm is present are shown below;

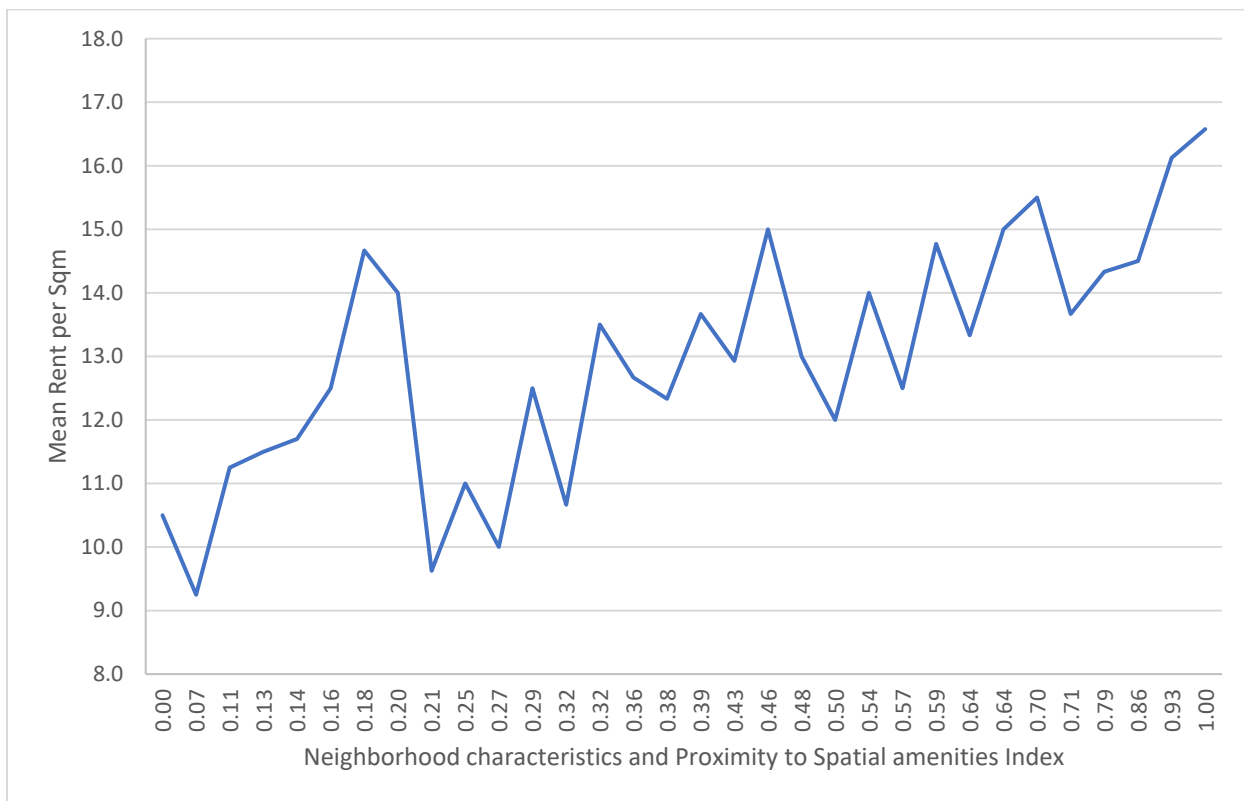


Figure 3. Mean of Neighborhood Characteristics and Spatial amenities effect on rent

Source: Authors Own Construct (2023)

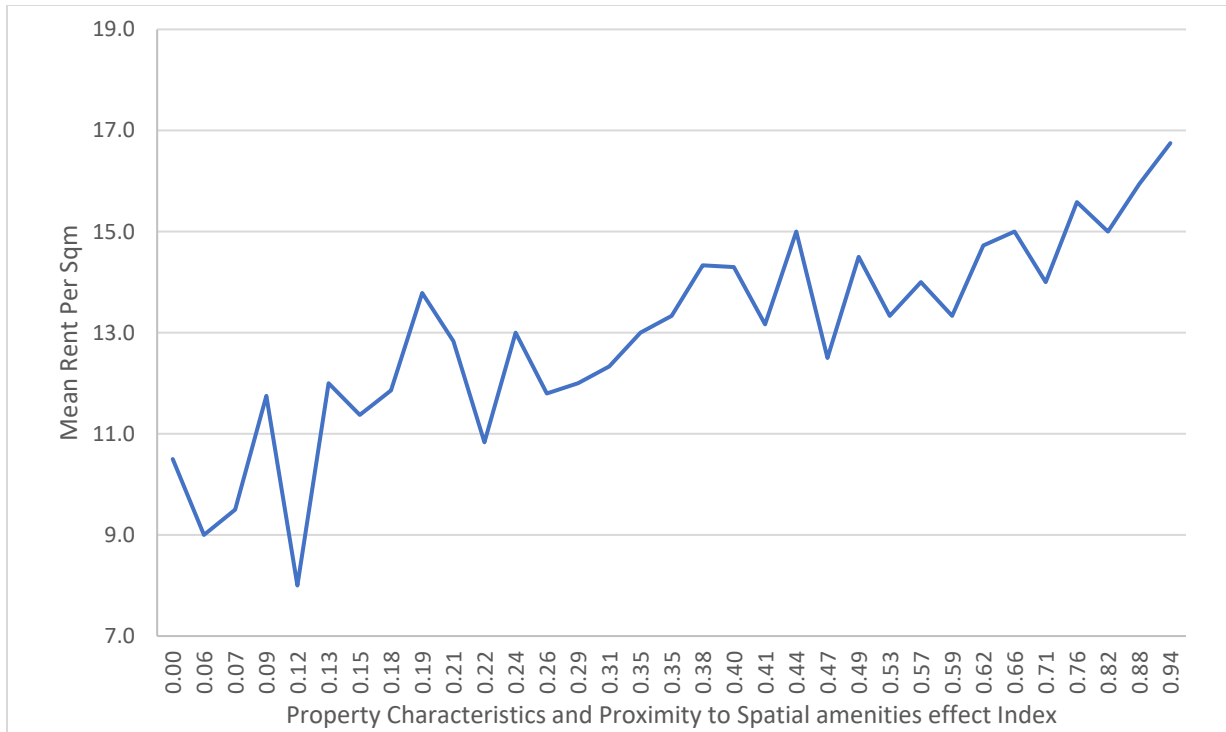


Figure 4. Mean of property characteristics and spatial amenities on rental values

Source: Authors Own Construct (2023)

4.2.3 Overall regression results

The research conducted an in-depth examination of the interplay between spatial amenities, property neighborhood attributes, property characteristics, and their combined effects on property rental values within the CBD. The findings underscored the multifaceted impacts of various spatial amenities on rental values. While ocean scenic views exhibited a minor positive effect, its statistical insignificance aligned with previous observations of negative ocean view influences on property prices. Air quality demonstrated a moderate positive impact, supporting the idea that favorable breeze/air quality significantly contributes to property values. Proximity to walkable areas and beaches emerged as a robust factor, consistently highlighted in earlier research. Conversely, proximity to open spaces showed a modest positive impact with marginal significance.

In terms of property neighborhood attributes, the study illuminated their substantial influence on rental values. Privacy, accessibility to essential facilities, security and safety measures, and noise levels exhibited meaningful correlations. The presence of property management services, advanced security systems, noise reduction, and quality drainage positively influenced rental values. Various amenities such as elevators, Wi-Fi availability, and property management services were identified as contributors to enhanced rental values. Moreover, the study explored the interactions between property characteristics, spatial amenities, and property neighborhood

attributes, revealing their combined effect on rental values. These interactions exhibited significant explanatory power, indicating that these factors collectively play a crucial role in shaping rental values.

4.3 Model fit and Robustness of the models

The assessment of model validity involved employing both White's test for heteroskedasticity and the Variance Inflation Factor (VIF) statistics to gauge the presence of multicollinearity. White's test as displayed in Table 10, characterized by an F-statistic of 1.682110 and an Observed R-squared value of 60.7, along with a corresponding p-value of 0.0414, supports the notion of consistent random error. This p-value signifies a probability below 5 percent, indicating the absence of significant heteroskedasticity within the random error. Moving to the VIF analysis in Table 11, the highest VIF value recorded is 2.818. This relatively low value aligns with the desired outcome, underscoring the absence of multicollinearity within the model. This analysis collectively underscores the favorable fit of the data to the regression line and affirms the model's proficiency in elucidating fluctuations in rental values for the specific property category in the case study.

Table 10. White's Test

F	1.053
P-Value	0.414
Observed R Square	60.7

Table 11. Collinearity Statistics

ABBR	VIF	ABBR	VIF
WGR	2.461	WLF	2.325
SCV	1.870	QAP	2.411
WIN	2.03	SVS	2.018
OPS	2.375	RST	2.250
PS	5.749	HSP	2.308
TLS	3.038	BNK	1.977
BRM	2.264	BST	1.915
SCS	5.551	EDU	2.256
LE	3.671	MKT	2.106
WTS	1.754	MJR	1.699
ASG	6.507	PLS	2.08
WFH	1.679	GEN	1.584
SWD	2.125	NTN	1.669
SWP	1.426	EXP	3.069
GDN	2.464	EDL	2.099
PMS	3.775	EMP	2.818
COS	3.744	INC	2.724

Conclusion

In conclusion, the research study on the spatial dimensions of real estate markets in the CBD has highlighted the importance of spatial amenities, property neighborhood attributes, and property characteristics in determining rental values. This research study provides valuable insights into the determinants of property rental values in the diverse locations of the Central Business District (CBD) in Dar es Salaam. The findings emphasize the positive impact of spatial amenities such as proximity to walkable areas, open spaces, and desirable features on rental values. Property neighborhood attributes and property characteristics were also found to significantly influence rental prices. Additionally, the study validates the substantial positive effect resulting from the interaction between property characteristics and spatial amenities on rental values. The study findings also underscore the importance of spatial amenities, property neighborhood attributes, and property characteristics in influencing rental prices. The study emphasizes the need to consider both the individual property features and the surrounding neighborhood and amenity context when assessing property rental values. These findings contribute to a deeper understanding of the factors driving rental values in the CBD and provide insights for decision-making in the real estate market and can inform real estate professionals, policymakers, and investors in making informed decisions regarding property investments and rental pricing strategies in the CBD.

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**Non-Peer Reviewed*

Housing Affordability in Kenya: How Alternative Building Materials can be used to lower the Cost of Housing in Kenya

James Waswa; Nicky Nzioki; Catherine Kariuki

Introduction

The demand for affordable units is more exacerbated in the urban areas, especially in Nairobi. According to the 2019 census, Nairobi's population grew from 3.1 million to 4.4 million, representing an annual growth of almost 3.4% per annum. This can be compared to the nationwide growth of 38.6 million to 47.6 million. The population of Nairobi is forecasted to grow to 5.6 million in 2025. This can be used as a sample of cities in the country and possibly other urban areas in third-world countries in Africa.

Despite growth in population in the country, the number of housing units delivered per year is unable to match the demand. In addition, the government is a relatively passive participant in the sector allowing the private sector to play a major role in supplying housing across all economic levels (Walley, 2011). The government plays the role of an enabler but as history has evidenced in the past, there is typically a housing deficit where government takes a backseat. Noppen argues that the country is experiencing a housing thrive impacting on the viability of potentially affordable homes. The misalignment between demand and supply puts buyers at the mercies of developers who being rational and business-oriented would be willing to secure the best rate of return (Noppen, 2013).

The Affordable Housing Plan (AHP) was launched as part of the four pillars of development by former president, H.E. President Uhuru Kenyatta. Promising to take the burden off Kenyans' shoulders, AHP was to produce 500,000 units by 2022 pricing them between Kes. 1 to 3 million. While these costs might be cited as 'affordable', they are bound to increase in the foreseeable future given the increase in demand for serviceable land and construction costs. This year, construction costs are estimated to have risen by 7% mainly attributable to an increase in the cost of cement, bitumen, fuel, and steel (Ambani, 2023). The Kenya National Bureau of Statistics reported through the Construction Cost Index that construction cost inputs rose in the fourth quarter of 2021 to 2022 from 106.21% to 113.65%. This was forecasted by Vuluku & Gachanja in 2014. The authors had commented on the overreliance of Kenya on imports (i.e. steel, tiles, furniture, ceramic, fixtures, etc.) to meet market demands. A weaker shilling would result in higher housing costs. Between January 2020 and January 2023, the Kenya shilling has lost 25% of its value compared to the US dollar (Business Daily, 2023).

With its vital position in the physical, social and physiological development of a society, housing is a necessary asset for every household. Rising construction costs could mean an increase in affordable housing prices even with the enabling environment provided by the government. A consideration of switching to alternative building materials could prove the solution that the country needs.

The Housing Market

Housing plays a critical role in the life of every household generating consumer services and also serves as a potential investment good. Its acquisition in the primary market, however, is hinged on a household's income, the prices of available parcels or housing units and the interest rates offered. Compared to other economic goods, the housing market operates within an imperfect market. Information is never completely available to either the buyer or seller and the players behave irrationally to the available information (Augustyniak, et al., 2015). Solutions offered towards housing revolve around creating more transparent relations in the property market. This role is often left to the state due to its influence and market-shaping policies (Danilova & Litvinova, 2021).

According to the World Bank, approximately 244,000 housing units are required annually to meet demand nationwide. The formal market has been unable to meet this demand over the years resulting in a bulging deficit that is estimated to be within the range of 2 million units. An increase in population and an increase in demand for serviced land only adds oil to the fire. Keynesian theory and the economic laws of demand and supply support an increase in the price of land and available housing units.

Being a developing nation, Kenya's population curve is still on the rise. This has an impact on the demand for housing and subsequently on the cost of serviced land. With a rise in the cost of land, a passive approach by the government, and Kenya's capitalistic economy, it would be difficult for developers to consider affordable housing for those on the end of the income scale. As a cautionary note, it is not uncommon to hear about the displacement of lower-income households as developers look for available land to set up units for the more affluent households in society (Sharma, et al., 2021).

The legal provision for affordable housing

Prior to 2010, the right to housing was not implicitly recognized in its statutory framework. But it was not blind to the need for housing units, affordable housing units for its citizens. History has it that several policies and legal frameworks were made over the decades that had an impact. The maiden national housing policy was made in 1966 via Sessional Paper No. 5 of 1966. The housing policy recommended the establishment of a national housing authority to facilitate the provisions of the document. The National Housing Corporation (NHC) under the Housing Act. After the amendment of the Constitution in 2010, Section 43 (1b) was introduced providing that every person has the right to "accessible and adequate housing and a reasonable standard of sanitation." (Wambugu, 2018)

It was after the introduction of this section in the Constitution did we see a surge in legal cases promoting and defending the right to accessible and adequate housing. One of the landmark rulings, Susan Waithera and others vs. the Town Clerk, Nairobi City Council and two others provided: "Most of the court decisions have mainly focused on the negative obligation of the state with regard to the right to adequate housing. So far there is very little that has been done to clarify the specific and concrete steps that the government should take to improve the livelihoods and living standards of the millions of people who continue to live in inhumane conditions in most of

the urban informal settlements and rural areas. This is the new battle zone for the right to adequate housing and indeed for all economic and social rights. We hope that this report, which is the second in our series of annual reports on the state of housing rights in Kenya, will contribute in some small way to making this possible.”

A key barrier to the development of housing units was the issue of land fraud and the unreliability of the land administration system. To iron out the kinds and improve the accuracy of the land system and create a robust local market, the National Land Policy (NLP) was adopted. The policy pushed for the overhaul of the current land policies to address chronic land issues that had tainted the picture of the Kenyan real estate market. It is from these recommendations that we saw the introduction of the Land Act, the Land Registration Act, and the National Land Commission Act in 2012. The NLP envisioned and propagated for equitable and sustainable use of land while providing for principles in the management of land and protection of fragile ecosystems.

The position of affordable housing in Kenya

It seems the government has taken a step back and relaxed into a role of formulation, appraisal, and execution of housing policies and legislation. Many in the Kenyan market believe that it is the private sector that plays a major role in the supply of affordable housing despite the potential of the government as a fundamental enabler (Matindi, 2008). Since its inception, NHC has been playing ‘catch-up’ to market needs and demands for housing. A case point is the 1974 to ’79 Development Plan. It was estimated that (under the development plan and taking into consideration market needs) 110,000 housing units would be required in urban areas to house the population. At that time, there was already a deficit of 50,000 housing units in the urban market. Within the same period, NHC only managed to construct 11,406 units. The current housing shortage in 1979 stood at 148,594 units, excluding the units constructed by the private sector (Ogutu, 1978). Thus began the deficiency in housing units that led to the current scenario with an undersupply of over 2 million units and a need for 250,000 housing units annually (CAHF, 2022).

With development left to the private sector, housing became a business. And a rational business person will seek to provide a solution to willing buyers with the financial capabilities to purchase the ‘available products’. Fueled by the desire for a profit, developers focused on housing for the upper middle class and high-net-worth individuals leaving the rest of the demographic to settle for below-par forms of housing. Financial institutions followed suit. To reduce risk, they opted for salaried individuals as opposed to those individuals in the informal sector (Ojijo, 2013). These and other factors influenced the type of properties and the asking price for the final development.

The Affordable Housing Programme in Kenya was one of the pillars of the Big Four Agenda implemented by President Uhuru. The four pillars, which were centred on the issues of food security, manufacturing, provision of universal health care, and affordable housing, were meant to promote long-term economic development for the country.

Some of the housing projects being developed in the AHP Programme are as described below:

Housing Program	Developer	Location	No. of Units
Pangani Affordable Housing Program	National Govt. & Tecnofin KE	Pangani	1,562
River Estate Affordable Housing Program	National Govt. & Edderman Property Ltd.	Ngara	2,720
Park Road Affordable Housing Program	National Housing Corporation	Ngara	1,370
Mukuru Affordable Housing Program	National Housing Corporation	Mukuru, Enterprise Road	15,000

Source: Boma Yangu Portal

Other projects that have been launched in the recent years and are under construction include Shauri Moyo A Affordable Housing Project (3,848 units), Ruiru Affordable Housing Project (1,050 units), Homa Bay Affordable Housing, NHC (2,000 units) and Starehe Affordable Project (6,074 units).

However, the chief question is “Are these affordable housing units actually affordable?”

According to the AHP Programme, there will be three main typologies offered; a one-bedroom unit of 30 metres squared at Kes. 1 million, a 2-bedroom unit of 40 metres squared priced at Kes. 2 million and a 3-bedroom unit of 60 metres squared priced at Kes. 3 million. Despite the ‘affordable prices’ quoted by the AHP Programme, most Kenyans are unable to meet the set regulations by financiers to apply for home financing. The government introduced the Kenya Mortgage Refinance Company (KMRC) which would work in tandem with banks and financial institutions to offer mortgages at fixed interest rates below 10% (State Dep. for Housing and Urban Development, 2023). We can contrast this to information obtained from the Kenya National Bureau of Statistics (KNBS) on income.

The KNBS reveals that the country’s annual gross national income grew to Kshs. 241,474 from Kshs. 216, 337; an increase of 11.6% between 2021 and 2020. Therefore, the average Kenyan earns Kes. 20,123 per month (Business Daily, 2022). Juxtaposed against the prices of the affordable housing units and assuming a 30% allocation of income to housing needs, it will take a Kenyan approximately 12 years, 25 years, and 37 years to afford the 1, 2, and 3 bedroom units respectively. This is working with the assumptions of a stable income, 0% mortgage rate, and a stable economy among other factors.

While the current formal property landscape has seen the introduction of ‘new’ affordable housing at or slightly below the Kes. 2 m market, this price point is still unaffordable to a significant segment of the low-income population. This fact is evidenced once you factor in the increased living cost.

With the mismatch in the growth in income and purchasing power compared to the appreciation of property and increase in average house prices, the brunt of the situation will be felt by the low-income earners as they will be abandoned in the search for profit and an above-average return.

Thus, we reiterate the question, can alternative building materials be introduced to lower the cost of ‘affordable housing’ to the low-income earners in Kenya?

What influences the selection of building materials?

Before we consider new/ alternative building materials, we must first assess the current selection criteria. It can be deduced that alternative building materials should also be able to meet the same criteria to be considered as ‘true substitutes’.

Cost

As mentioned earlier, most of the housing units are developed by private entities whose main concern would be the return on investment. The most affordable option while taking into consideration the strength and other pertinent issues will be preferred. Sub-standard materials will only call for replacement in the near future reducing the profit margin in the long run.

Strength

Building and construction materials are often subjected to significant tension and compression forces. A developer will often choose a building material that can withstand these stresses over the years without distortion to its shape or its utility.

Sustainability

As the call for development increases, so does the push for green products, sustainability, and mitigations to climate change. An increasing emphasis is also being placed on the sustainability of materials specified. Construction processes on conventional sites often see a significant level of waste material either through profligacy or damage. Other environmental factors that have a significant impact on the local community but are often ignored include noise pollution, traffic movements, and air pollution (NHBC Foundation, 2016).

In assessing the sustainability and eco-friendliness of construction technology, the following criteria should be considered:

Local materials usage

Non-renewable resources in manufacturing or production usage

Waste products usage

Ability of the material to be recycled.

Waste generation and utilization of waste generated.

Pollution through emission of hazardous materials.

MHUPA (2015).

Social Issues and Perception

Due to the cost implications of construction, formal buildings are conceptualized, developed, and occupied by individuals and households with considerable means. Some of the ABMs are perceived to have a 'rural feel'. A good example is ISSBs which often use mud and wattle. This perception is common among medium to high income earners who deem the items to be of poor quality due to the affordable costs. Promoters and companies in the ISSB market can attest to the lack of acceptance due to the perception that "use of cement in soil blocks leads to the desired strength and durability of a house" (Margret, 2015).

Time

More often than not, the construction of a building is in response to certain conditions that are clear (somewhat) to key players. A key player would wish for their development to enter first into a market and thus enjoy the full benefits of 'being the first (Odongo, 2019). Savings in construction time are of significance to various stakeholders in the construction industry. A rational developer would assess the construction speed of an ABM in comparison with the conventional method.

Available Alternative Building Materials in Kenya

Below are some of the available alternative building materials that are currently being used or can be used in Kenya.

Expanded Polystyrene Sheets/ Panels (EPS)

EPS is made of polystyrene, an aromatic polymer that is transfigured into pre-expanded polystyrene beads to form either molded sheets or styroboard EPS. The panels have been used as building insulation or packing materials. Styroboard EPS, which is strong and lightweight is used as a construction material (Mwafongo, 2012).

Styroboard EPS is consistent with other orthodox construction materials in terms of characteristics. It has insulating properties that protect occupants from noise and unwanted temperatures. The panels also have low moisture absorbency rates and are weather-resistant. EPS panels can be manufactured to varying degrees of thickness depending on customer specifications and use. To significantly enhance its thermal conductivity often Styroboard EPS is incorporated in masonry walls. In the era of sustainability, Styroboard EPS complies with set standards somewhat. Its production can be deemed environmentally friendly since there are minimum emissions of ozone-depleting gases and its degradation doesn't create harmful or toxic substances (Mwafongo, 2012).

Having been used widely across the world, the panels have been tested. They are known to have high compressive resistance and high resiliency. The panels can be used for repetitive loading of roof insulation, road building, sub-pavement flooring and as a general load-bearing insulation. While they can be adjusted to fit various specifications, the panels can handle compressive resistance of approximately 60 PSI (EPS Industry Alliance, 2018).

EPS panels have enjoyed considerable uptake in the development of both residential and commercial units in Kenya. Some of the developments include Balozi estate along Thika Road, Nairobi (2010), Silver Springs Hotel extension in Nairobi (2007), partitioning and remodeling of

Chinese Restaurant at Adams Arcade, off Ngong Road, Nairobi (2011) and Ruai Police Housing Scheme (2013) just to mention a few (Ngigi, 2016).

Interlocking Stabilized Soil Blocks (ISSB)

As established earlier, a prudent developer will push the final costs of construction (plus his profit/return/ markup) onto the final consumer i.e. the property buyer and occupier. Finding an appropriate material that would be both economical and appeal to consumers' tastes and preferences will work well to significantly reduce the final costs. One such building material is interlocking stabilized soil blocks (ISSB). The blocks are not local to Kenya and have been used successfully in other countries in the world.

To produce these blocks, cement is mixed together with soil and water depending on the soil's characteristics. The composition is then fed into a simple machine that compacts it into blocks. They would then be covered with polythene paper or a substitute for a period of a week or so to cure; after which, they would be ready to be used in construction (Geoffrey, 2001).

Compared to its cousin the clay brick, ISSBs are considered more sustainable and environmentally friendly. Clay bricks are fired in brick kilns as the final process. ISSBs preserve timber (forests) and thus reduce the emission of carbon dioxide. The production process is also faster, easier, more affordable, and user-friendly. The main drawback to using ISSBs is the quality. One can expect a varying quality of ISSBs depending on the type of soil used, method of production, and the stabilizer used (Ngigi, 2016).

Fiber Reinforced Concrete (FRC)

As the name suggests, FRC contains fibers that are uniformly distributed to improve the tensile strength of concrete. Some of the commonly used fibers include synthetic fibres, natural fibers, steel fibers, or glass fibers which add different structural characteristics to the concrete. As a result, FRC quality, tensile strength, and other pertinent properties will rely on fiber material, distribution, geometrics, and densities. While these fibers may increase concrete's shatter resistance, permeability, or its impact abrasion, they are not a substitute for steel reinforcement. In the past, FRC has been used to create roofing tiles, serving as an alternative to asbestos sheets or galvanized iron sheets (Gallen, 1992). FRC roofing tiles are durable (with some being used for more than two decades, are relatively affordable, aesthetically pleasing, and offer considerable protection from the elements (Roland & Kiran, 1993). FRCs are also fire resistant and offer better thermal and acoustic characteristics especially when compared to GCI sheets. Considering the technology used in their production, the tiles are relatively lightweight. They would require less supporting structure (be it timber or steel). And in areas where cement is not readily available, it can be produced as a substitute (Gallen, 1992).

FRC is not without drawbacks and limitations. It is still reliant on the availability of cement in the locality. In addition, it requires clean water in the production and curing process; which might not be readily available everywhere. The production of FRC is technical and requires experts who can set standards with regards to quality control (Gallen, 1992).

Artificial Pozzolans

A pozzolan can be defined as a siliceous and aluminous material which is mixed with calcium hydroxide in the presence of water to react chemically forming compounds that possess cement-like properties (Mehta, 1987). By this definition, what can be identified as a pozzolan or pozzolanic can be a wide range of compounds; as long as it reacts with calcium hydroxide and water and possesses cement-like characteristics.

Pozzolans can have different composition, origins, and properties. They can also occur naturally or artificially, with a significant number of pozzolanic products being man-made. Some pozzolans are by-products of high-temperature processes. A good example is fly ash which is a by-product of coal-fired electricity production (Schneider, et al., 2011). As it stands, industrial by-products make the majority of the most used pozzolans such as fly ash, silica fume from silicon smelting, highly reactive metakaolin, and rice husk ash (Mweu, 2017).

Challenges in the adoption of ABM in construction

A significant dynamic that has hindered the adoption of ABM is the cost of raw materials. From the alternative options listed above, you can appreciate the use of cement. It is one of the commonly used ingredients in the production of ABM. The cost of cement is on the rise in most African countries including Kenya (U.S. Geological Survey, 2011). *Include data on rising costs of cement and clinker in Kenya.

Many of these alternative building materials require technical know-how and expertise, which many developers and building professionals still lack. While the use of ABM is recommended as a better alternative to conventional materials, the lack of technical knowledge limits its adoption by the main stakeholders. In Sub-Saharan African countries where the need for housing is high, small scale developers are not cognizant of ABM specifications leading to low adoption. And even if adopted, the final product performs poorly (UN-Habitat, 2010).

Adoption of ABM is not supported by policies and regulatory framework. Property is one of the most highly regulated sectors of any society due to the role it plays from a psychological, physiological, and economical perspective. These laws touch on every element of property including the construction of developments. Most countries will attest to having building laws and codes that guide and prescribe on this. These policies, regulations, and economic measures are used to determine environmental friendliness and sustainability of construction materials (Mpakati, et al., 2011). Without incorporation of ABM into construction laws and guidelines, we cannot expect developers (both large scale and individuals) to incorporate these materials.

In most scenarios, ABM technology needs to be customized to the local conditions within a country. A good example is the Interlocked Stabilized Soil Blocks, ISSBs. The ratio mix of soil, cement, and water depends on the type and quality of the soil. Locally based studies and research need to be conducted to establish the ideal ABM in a region that might be unsuitable for use in another (Acosta, 2000).

Impact of alternative building materials on cost

Let's have a look at the size of the housing provided for the AHP. According to information provided on the Boma Yangu platform, the size of a 1-bedroomed unit is 30 square metres, a 2-

bedroomed unit is 40 square metres, and a 3-bedroomed unit is approximately 60 square metres. We will use this information to analyse the cost of each unit. We acknowledge and understand the difference between price, cost and value however it is with the costings of the project that we would be able to a good comparison of the building materials.

Our method of analysis/ comparison will be the cost approach; an approach that provides an indication of value using the economic principle that a buyer will pay no more for an asset than the cost to obtain an asset of equal utility, whether by purchase or construction (RICS, 2022).

Below is an analysis of the various building materials' costings for the walling as per the IQSK construction handbook and specialists from the National Housing Corporation:

Solid concrete block walling: Kes. 2,400 per square metre

Brickwork: Kes. 1,600 per square metre

Stabilized Soil Blocks: Kes. 1,100 per square metre

For EPS Panels: Kes 2,300 per square metre

Given the rule of thumb that walling can cover from 15 to 25% of construction cost and a wall to floor ratio of 0.4, we can deduce the following:

Construction material	1 bedroom (30m ²)	2 bedroom (40m ²)	3 bedroom (60m ²)
Solid concrete block walling	18,000/-	24,000/-	36,000/-
Brickwork	12,000/-	16,000/-	24,000/-
Stabilized soil blocks	8,250/-	11,000/-	16,500/-
EPS Panels	17,250/-	23,000/-	34,500/-

Potential pricing of new units

	1 bedroom (30m ²)	2 bedroom (40m ²)	3 bedroom (60m ²)
Solid concrete block walling	1,000,000/-	2,000,000/-	3,000,000/-
Brickwork	660,000/-	1,320,000/-	1,980,000/-
Stabilized soil blocks	458,000/-	916,000/-	1,374,500/-
EPS Panels	958,300/-	1,916,000/-	2,874,000/-

Recommendations

The uptake of alternative building materials in the country has been rather slow and marked by a lack of a solid regulatory framework, slow adoption by key players, research gaps for a local context, and varying quality of workmanship. Proper addressing of these issues will change perception of both developers and consumers of housing units boosting awareness and acceptance of new housing units using alternative building technology.

As it stands, Kenya imports a considerable amount of its construction products from clinker to steel. Given the challenges in global logistics, increasing in local taxation rates, and the devaluation of the local currency, it would be impossible to expect a decrease in price in affordable housing units. There needs to be a long-term solution that can offer a reprieve for Kenyans given that housing is a basic right to all.

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The Green Mirror: Reflecting on Sustainability Reporting Practices of Indian and Australian Real Estate Stakeholders

Raghu Dharmapuri Tirumala

Abstract

Historically, sustainability in real estate has centered on green buildings and environmentally friendly structures. However, these efforts have often been confined to individual buildings, overlooking the broader ecosystem. This research paper expands the focus, investigating how various stakeholders in the real estate sector, including developers, financiers, suppliers, and advisors, are addressing environmental challenges. Utilizing the Global Reporting Initiative (GRI) as a framework, the paper analyzes publicly available company disclosures. The results highlight a strong emphasis on emission and energy-related indicators, while other vital aspects such as biodiversity, supplier assessment, and materials are often neglected. The paper also explores regional variations and alignment with global standards, providing insights into the current state of sustainability reporting within the industry. By identifying areas for improvement and underscoring the importance of a multi-stakeholder approach, this study contributes valuable perspectives to the ongoing dialogue on environmental stewardship in real estate and offers actionable recommendations for enhancing transparency and sustainability practices.

Keywords: Australia; India; Environmental disclosure; Real Estate; Stakeholders; Transparency

Introduction

The size of the worldwide real estate market was assessed at USD 3.88 trillion in the year 2022 and is expected to rise to a projected USD 6.13 trillion by the year 2030. This growth is projected to occur at a compound annual growth rate (CAGR) of 5.2% during the anticipated timeframe of 2023 to 2030 (Research and Markets, 2023). Real estate, serving as the paramount reservoir of wealth, surpasses the combined value of worldwide equities and debt securities. Its valuation is nearly fourfold that of the global Gross Domestic Product (GDP) (Savills Impacts, 2021). As per International Energy Agency (IEA) estimations, the real estate sector is responsible for producing 40% of the CO₂ emissions of the world. This sector holds substantial significance in relation to the overarching endeavor to achieve the objectives set forth in the Paris Climate Agreement, particularly in terms of constraining the average temperature escalation significantly under 2°C from the pre-industrial levels. Out of these building operations produce 70% and remaining 30% gets generated from construction (Architecture 2030, 2023).

The real estate industry has come under significant scrutiny for its central role in environmental and social challenges, particularly in light of its contribution to carbon emissions. In 2021, the industry reached an all-time high, emitting approximately 10 gigatons of CO₂ equivalent (CO₂e), a trend that raises concerns regarding the fulfillment of climate goals set forth in the Paris Agreement. According to the UNFCCC, EU, and 193 countries (excluding Yemen, Iran, and Libya), their Nationally Determined Contributions (NDCs) have been submitted. Notably, the

report highlights that 80% of these countries have indirectly referenced buildings, and thus real estate, as an action point within their NDCs. Furthermore, while 40% of the 193 countries have implemented building energy codes, only 26% have made adherence to these codes mandatory. To align the real estate industry with global carbon reduction targets, stakeholders across the sector must take responsibility for understanding the environmental impact of their decisions. This includes considering material choices throughout the entire lifespan of buildings, as emphasized by the United Nations Environment Programme (UNEP) in 2022 (UNEP, 2022).

In CBRE's 2021 Global Investor Intentions Survey, a significant shift towards sustainability was observed, with 60% of respondents indicating that they had integrated Environmental, Social, and Governance (ESG) criteria into their investment strategies. This trend was especially prominent in the Americas, EMEA, and Asia-Pacific regions, reflecting a growing emphasis on ESG factors compared to earlier survey periods (Müller, 2022). As the real estate industry continues to evolve, it is anticipated to face an increase in regulatory measures and the implementation of innovative policies. These may encompass more rigorous construction standards, the establishment of carbon pricing mechanisms, and the introduction of additional reporting benchmarks, all aimed at aligning the sector with global sustainability goals (UNEP FI, 2023). Such developments underscore the industry's critical role in environmental stewardship and signal a broader shift towards responsible investment and development practices.

Stakeholders within the real estate sector possess a diverse spectrum of pathways to consider in their course of action. These encompass endeavors such as environmentally conscious development and construction, the revitalization of structures to enhance energy efficiency, enhancements to heating, cooling, and lighting systems, as well as the integration of technological solutions for demand and consumption management (Boland et al., 2022). As per the Global Alliance for Buildings and Construction, in order to reach the worldwide decarbonization goal, the predominant approach to new building construction in all economies by 2050 should involve net-zero energy and carbon-neutral buildings (Tan & Zheng, 2022). It is further stated that such steps also require a collaborative effort involving all stakeholders along the real estate industry value chain. This effort should focus on diminishing material demand, reducing embodied carbon, and embracing nature-based solutions that bolster building resilience (Tan & Zheng, 2022).

Historically, the discourse surrounding real estate and sustainability has been largely confined to the realms of green buildings, green building ratings, and reductions in embodied carbon. These initiatives, while valuable, have been limited to individual building levels. A more comprehensive approach is needed, one that engages the entire spectrum of stakeholders to collectively realize the sector's environmental, sustainability, and net-zero targets (Tien Doan et al., 2023). The challenge of decarbonization extends beyond mere technical obstacles. It requires stakeholders within the real estate industry to explore and comprehend various strategies for reducing carbon emissions across all parties involved. This includes understanding not only the financial implications but also the strategic benefits and costs associated with these choices (Boland et al., 2022). To align the real estate sector with the ambitious goal of achieving net-zero carbon emissions by 2050, a concerted effort is required. Stakeholders across the buildings' value chain must intensify their commitment to decarbonization, increasing their impact by a factor of five (Tan & Zheng, 2022).

This collective endeavor underscores the industry's pivotal role in global sustainability efforts and the necessity for a unified approach to meet the pressing challenges of our time.

Recognizing the critical interplay between stakeholders and mounting environmental challenges, this paper embarks on an in-depth exploration of how the entire real estate ecosystem is responding to issues related to climate change and emission reductions. While much of the existing literature has focused on specific subsets of stakeholders, such as real estate firms or REITs, there is a notable gap in research that encompasses the full spectrum of the stakeholder ecosystem. This includes developers, suppliers, financing partners, institutional investors, facility management companies, international property consultants, and REITs. This paper seeks to fill this void by delving into the specific issue of transparency within the real estate sector as it pertains to addressing climate change and other environmental concerns. The subsequent sections are methodically structured to provide a comprehensive analysis: the next section offers a review of existing literature, followed by a detailed explanation of the methods and data collection. The fourth section presents the results and discussions, the fifth explores policy implications, and the concluding section summarizes the findings and outlines directions for future research. By casting a wide net over the multifaceted landscape of real estate stakeholders, this paper contributes valuable insights to the ongoing dialogue on sustainability and responsible industry practices.

Literature review

In the real estate industry, terms such as green real estate, sustainability, eco, energy-efficient, and footprint have become emblematic of a growing commitment to environmental considerations by developers and investors. The concept of 'green buildings' has emerged as a specific reference to environmentally friendly structures, setting them apart from conventional constructions (Hebb et al., 2010). The advocacy for green buildings (GB) is recognized as a vital strategy to achieve environmental sustainability, despite the higher upfront costs, as the long-term environmental benefits are seen to justify these expenditures (Juan et al., 2017).

The research domain of green buildings has seen a proliferation of scoping reviews, encompassing diverse aspects such as green building materials, barriers to adoption, drivers, environmental performance, rating systems, assessment techniques, life cycle evaluation, post-occupancy evaluation, external stakeholders, life cycle assessment models, incentives, decision support tools, cost-benefit analysis, and evaluation standards (Wuni et al., 2019).

Recent studies have further enriched this field. For example, Lee et al. (2022) evaluated the impact of mandatory disclosure of building energy efficiency on the premium associated with environmentally conscious features in Australia, finding that green buildings consistently outperform non-green counterparts. Ofek & Portnov (2020) explored consumer familiarity with green building concepts, demonstrating that enhanced awareness leads to a willingness to pay higher premiums and suggesting the need for customized strategies to engage various stakeholders.

The broader context of environmental sustainability in construction has also been examined. Ali et al. (2020) provided a comprehensive analysis of concerns, repercussions, and strategies for CO2 emissions reduction and management, emphasizing the continued reliance on unsustainable fossil fuel energy in construction and operation phases. Research on the influence of GRESB ratings on

Real Estate Investment Trusts (REITs) across North America, Asia, and Europe from 2011 to 2014 revealed a positive correlation between commendable sustainability scores, operational efficiency, and reduced stock market risks (Ferrell et al., 2016).

In contrast, a study by Brounen et al. (2021) on European publicly traded real estate markets, using LEED and related certifications, disclosed an adverse impact on performance metrics such as return on assets (ROA), return on equity (ROE), and stock alphas, attributed to the additional expenses of renovations for BREEAM and LEED certification.

This present study contributes to the field by evaluating the environmental aspects through an examination of disclosure transparency within the real estate industry. Unlike prior studies that considered environmental, social, and governance collectively (Bissoondoyal-Bheenick et al., 2023), this research disaggregates these components to assess specific disclosure reporting levels for climate change and other environmental aspects among various stakeholder groups. Recognizing a significant research gap in the comprehensive evaluation of real estate sector disclosure transparency, this research aims to illuminate the current state of disclosure transparency and identify stakeholder groups requiring further efforts to enhance green practices related to climate change and other environmental aspects.

Method and Data Collection

The Global Reporting Initiative (GRI) functions as an independent global standards entity, assisting various organizations in understanding and communicating their impacts on environmental, social, and governance (ESG) concerns. Established in 2000 by the Global Sustainability Standards Board, GRI standards are recognized as the prevailing global benchmarks for ESG reporting (GRI, 2023a). Unlike prior frameworks, GRI standards are organized modularly, allowing for convenient updates and adjustments. These standards promote standardization in content, format, and other reporting requirements, enhancing the quality and credibility of sustainability reports (Luo & Tang, 2022). They are the preferred method for ESG communication (KPMG, 2023). The GRI standards have become an essential tool for organizations within the real estate sector. To effectively communicate sustainability strategies and initiatives, companies often rely on sustainability reports or dedicated sections in annual reports, which are predominantly based on the international regulatory framework provided by the GRI. This widespread adoption underscores the relevance of the GRI standards in assessing disclosure transparency related to environmental, social, and governance (ESG) concerns. For this study, indicators focusing on climate change and other environmental aspects were selected. Table 1 lists all the indicators and sub-indicators considered.

Table 1 GRI Indicators and Sub-indicators List

Indicator Name	Sub-Indicator Name
GRI 301: Materials 2016	301-1 Materials used by weight or volume
	301-2 Recycled input materials used

		301-3 Reclaimed products and their packaging materials
GRI 302: Energy 2016		302-1 Energy consumption within the organization
		302-2 Energy consumption outside of the organization
		302-3 Energy intensity
		302-4 Reduction of energy consumption
		302-5 Reductions in energy requirements of products and services
GRI 303: Water and Effluents 2018		303-1 Interactions with water as a shared resource
		303-2 Management of water discharge-related impacts
		303-3 Water withdrawal
		303-4 Water discharge
		303-5 Water consumption
GRI Biodiversity 2016	304:	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
		304-2 Significant impacts of activities, products and services on biodiversity
		304-3 Habitats protected or restored
		304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations
GRI Emissions 2016	305:	305-1 Direct (Scope 1) GHG emissions
		305-2 Energy indirect (Scope 2) GHG emissions
		305-3 Other indirect (Scope 3) GHG emissions
		305-4 GHG emissions intensity
		305-5 Reduction of GHG emissions
		305-6 Emissions of ozone-depleting substances (ODS)
		305-7 Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions
GRI 306: Waste 2020		306-1 Waste generation and significant waste-related impacts
		306-2 Management of significant waste-related impacts

	306-3 Waste generated
	306-4 Waste diverted from disposal
	306-5 Waste directed to disposal
GRI 308: Supplier Environmental Assessment 2016	308-1 New suppliers that were screened using environmental criteria
	308-2 Negative environmental impacts in the supply chain and actions taken

Source: (GRI, 2023b)

Key stakeholder groups within the real estate sector were identified, including developers, raw material suppliers, REITs, facility management companies, international property consultants, and financial institutions such as banks, private equity players, and institutional investors.

The dataset comprises major publicly traded corporations from Australia and India exhibiting notable ESG facets within the real estate sector. A total of 38 companies from Australia and 34 from India were considered, with five companies selected for each stakeholder group, or fewer if less than five were available (e.g., three Indian REITs). Data were retrieved from company websites, sustainability reports, and annual reports. Table 2 lists the companies considered for all stakeholder groups.

Table 2 Companies considered for the study

Stakeholder Group	Australia	India
Developers	Goodman Group	DLF Limited
	Scentre Group	Godrej Properties Ltd
	Vicinity Centres	Sobha Ltd
	Stockland Corporation Ltd	Omaxe Ltd
	Mirvac Group	Mahindra Lifespace Developers Ltd
Raw Material Suppliers	James Hardie Industries plc	UltraTech Cement Ltd
	Boral Limited	Visa Steel Ltd
	Brickworks Limited	RDC Concrete (India) Pvt Ltd
	CSR Limited	Volve Construction Equipment
	Adbri Limited	Asahi India Glass Ltd
	Commonwealth bank of Australia	HDFC Bank Ltd

	Westpac Banking Corp	State Bank of India
	National Australia Bank Ltd	PNB Housing Finance Ltd
	Australia and New Zealand Banking Group Limited (ANZ)	LIC Housing Finance Ltd
	Bank of Queensland Ltd	ICICI Bank Ltd
	AMP Capital Investors	ICICI Venture Funds Management Company
	Macquarie Infrastructure and Real Asset	Kotak Private Equity Group
	Blackstone	Blackstone
Financial Institutions	KKR & Co. Inc.	KKR & Co. Inc.
	TPG Capital	Motilal Oswal Alternates
	Future Fund Australia	New York Life Insurance Company
	Bain Capital	The Canada Pension Plan Investment Board
	IFM Investors	Temasek's Mapletree
		Caisse de dépôt et placement du Québec
		Ontario Teachers' Pension Plan Board
	Goodman Group	Brookfield India Real Estate Trust REIT
REITs	Scentre Group	Mindspace Business Parks REIT
	Vicinity Centres	Embassy Office Parks REIT
	Stockland Corporation Ltd	
	Mirvac Group	
International property consultants	CBRE	Cushman & Wakefield
	Jones Lang Lasalle	CBRE
	Colliers	Jones Lang LaSalle

	Cushman & Wakefield	Colliers
	Knight Frank	Knight Frank
Facility management companies	CBRE	Cushman & Wakefield
	ISS Australia	
	Jones Lang LaSalle	

Source: Author's compilation from various sources

A two-fold approach was employed to evaluate the disclosure transparency related to environmental aspects within the selected companies in the real estate sector. First, a scoring system was used for each sub-indicator within a GRI (as listed in Table 1), assigning 1 point for disclosed information and 0 points for no information. The study estimated the percentage of disclosures for each sub-indicator within a GRI. The combined use of scoring and percentage calculations offers a comprehensive view of the disclosure practices related to environmental aspects within the real estate sector. The data collection table, including both scores and percentages, is presented in Annexure – A. The analysis involved evaluating the outcomes based on country, indicator, sub-indicator, and stakeholder group, allowing for a nuanced understanding of the disclosure transparency across different dimensions.

Results and Discussions

Table 3 provides a summary of the overall results, offering insights into the disclosure practices related to various environmental aspects within the real estate sector.

Table 3 Overall transparency scores

GRI Indicator	Disclosure transparency score	
Emission	224,	(44.44%)
Waste Management	125,	(34.72%)
Energy	129,	(35.83%)
Supply Chain	33,	(22.92%)
Water and effluent	89,	(24.72%)
Biodiversity	53,	(18.40%)
Material	10,	(4.63%)

Source: Authors' calculations

A notable observation from the data is the prominence of the Emissions category, which has received the highest number of disclosures at 44.44%, followed by Energy at 35.83%, and Waste

34.72%. This pattern suggests that the sector is placing a significant emphasis on emissions reductions, reflecting a broader industry trend towards mitigating climate impact.

Conversely, certain indicators appear to be receiving less attention (such as Water and Effluent at 24.72%, and Biodiversity at 18.4%), indicating that these areas are not among the top priorities for the sector. This could raise concerns about a potential imbalance in the focus on different environmental aspects, possibly overlooking critical sustainability factors.

These findings collectively paint a picture of a sector that is actively engaging with certain key environmental challenges, particularly emissions, but may be neglecting other equally vital areas. The results prompt a consideration of how a more balanced and holistic approach to environmental disclosure might be fostered within the real estate industry, ensuring that all aspects of environmental sustainability are adequately addressed.

Figure 1 presents country wise reporting disclosure scores for the indicators. For Australian companies Emissions and Waste indicators are highly disclosed indicators. Indian companies have highest disclosures for Emissions, followed by Energy indicator.

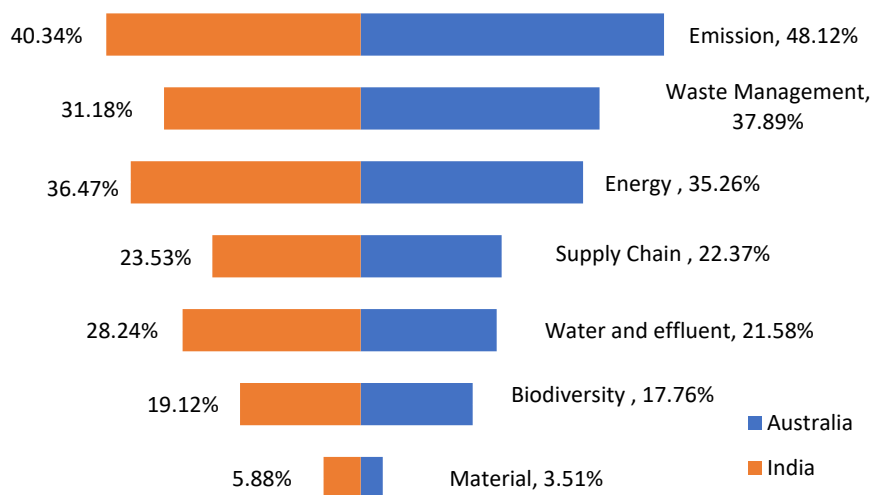


Figure 1 Country wise disclosure transparency scores

However, Supplier environmental assessment and Material are the least disclosed for both countries. For Australia Energy, Water and effluents and Biodiversity have lesser focus as compared to Emissions and Waste indicators. For India, Waste, Water and effluents and Biodiversity have lesser focus as compared to Emissions and Energy.

Table 4 shows stakeholder groups wise results for disclosure transparency scores. Most of the stakeholder groups are highly focused on disclosing emissions related sub-indicators. All the stakeholder groups are least focused on disclosing Materials related sub-indicators.

Table 4 Stakeholders wise indicators disclosure scores

Stakeholder Group	Material	Energy	Water and effluents	Biodiversity	Emission	Waste	Supplier environmental assessment
Developers	6.67%	46.00%	50.00%	35.00%	58.57%	60.00%	35.00%
Suppliers	20.00%	42.00%	30.00%	32.50%	47.14%	34.00%	30.00%
REITs	0.00%	37.50%	32.50%	25.00%	42.86%	52.50%	25.00%
Facility Management	0.00%	40.00%	30.00%	12.50%	60.71%	45.00%	37.50%
Financial Institutions	2.22%	26.67%	10.67%	10.00%	34.76%	21.33%	11.67%
International Property Consultants	0.00%	44.00%	28.00%	10.00%	51.43%	32.00%	30.00%

Source: Author's calculations

It is crucial to note that for developers, waste is the most disclosed indicator which is in alignment with the quantity of the waste this particular category has to deal with and so is for REITs. Suppliers' next target after Emissions is energy indicator which is again in alignment with their energy consumption levels and their reductions. As expected, financial institutions are having energy indicator next in line after emission. This aligns with their role as financial institutions and aligning their reporting with the global disclosures like Task Force on Climate-Related Financial Disclosures (TCFD).

Table 5 and 6 shows disclosure reporting scores for different stakeholder groups for Australia and India respectively.

Table 5 Australia disclosure reporting scores

Stakeholder group	Material	Energy	Water and effluents	Biodiversity	Emission	Waste	Supplier environmental assessment
Developers	0.00%	36.00%	28.00%	30.00%	57.14%	64.00%	20.00%
Suppliers	26.67%	56.00%	44.00%	45.00%	62.86%	40.00%	30.00%
REITs	0.00%	36.00%	28.00%	30.00%	57.14%	64.00%	20.00%
Facility Management	0.00%	40.00%	20.00%	16.67%	57.14%	40.00%	33.33%
Financial Institutions	0.00%	24.00%	8.00%	3.33%	34.29%	21.33%	16.67%

International Property Consultants	0.00%	44.00%	28.00%	10.00%	51.43%	32.00%	30.00%
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Source: Author's calculation

Table 6 India disclosure reporting scores

Stakeholder group	Material	Energy	Water and effluents	Biodiversity	Emission	Waste	Supplier environmental assessment
Developers	13.33%	56.00%	72.00%	40.00%	60.00%	56.00%	50.00%
Suppliers	13.33%	28.00%	16.00%	20.00%	31.43%	28.00%	30.00%
REITs	0.00%	40.00%	40.00%	16.67%	19.05%	33.33%	33.33%
Facility Management	0.00%	40.00%	60.00%	0.00%	71.43%	60.00%	50.00%
Financial Institutions	4.44%	29.33%	13.33%	16.67%	35.24%	21.33%	6.67%
International Property Consultants	0.00%	44.00%	28.00%	10.00%	51.43%	32.00%	30.00%

Source: Author's calculation

Results of table 5 shows that all the Australian stakeholder groups (other than developers and REITs) have maximum disclosure scores for Emission indicator. However, all of them have least focus on the materials indicator. For developers and REITs stakeholder groups waste related disclosures are of priority. Table 6 presents the similar results for Indian stakeholder groups. All the Indian stakeholder groups have least disclosure transparency scores for Materials indicator. Emission indicator has received the most attraction from all the stakeholders (except developers and REITs). Indian developers have greatest focus towards Water and Effluents. From the results, REITs have two top priorities Energy and Water and Effluents. Both of the them have received equal weightage from the REITs.

Sub indicator Transparency disclosure scores

Table 7 provides further in detail analysis of what sub-indicators have better disclosure transparencies and which ones are lacking. Table captures data for both the countries.

Table 7 Sub-indicator disclosure transparency scores

Indicator Name	Sub-Indicator Name	Australia	India
GRI 301: Materials 2016	301-1 Materials used by weight or volume	0.00%	5.88%
	301-2 Recycled input materials used	7.89%	8.82%
	301-3 Reclaimed products and their packaging materials	2.63%	2.94%

GRI 302: Energy 2016	302-1 Energy consumption within the organization	63.16%	50.00%
	302-2 Energy consumption outside of the organization	0.00%	5.88%
	302-3 Energy intensity	39.47%	50.00%
	302-4 Reduction of energy consumption	44.74%	41.18%
	302-5 Reductions in energy requirements of products and services	28.95%	35.29%
GRI 303: Water and Effluents 2018	303-1 Interactions with water as a shared resource	2.63%	14.71%
	303-2 Management of water discharge-related impacts	44.74%	50.00%
	303-3 Water withdrawal	10.53%	26.47%
	303-4 Water discharge	2.63%	5.88%
	303-5 Water consumption	47.37%	44.12%
GRI 304: Biodiversity 2016	304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	18.42%	26.47%
	304-2 Significant impacts of activities, products and services on biodiversity	23.68%	26.47%
	304-3 Habitats protected or restored	23.68%	17.65%
	304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	5.26%	5.88%
GRI 305: Emissions 2016	305-1 Direct (Scope 1) GHG emissions	81.58%	58.82%
	305-2 Energy indirect (Scope 2) GHG emissions	81.58%	58.82%
	305-3 Other indirect (Scope 3) GHG emissions	71.05%	41.18%
	305-4 GHG emissions intensity	23.68%	44.12%
	305-5 Reduction of GHG emissions	71.05%	58.82%
	305-6 Emissions of ozone-depleting substances (ODS)	0.00%	0.00%
	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	7.89%	20.59%
GRI 306: Waste 2020	306-1 Waste generation and significant waste-related impacts	5.26%	2.94%
	306-2 Management of significant waste-related impacts	63.16%	52.94%
	306-3 Waste generated	36.84%	35.29%
	306-4 Waste diverted from disposal	42.11%	41.18%
	306-5 Waste directed to disposal	42.11%	23.53%
GRI 308: Supplier Environmental Assessment 2016	308-1 New suppliers that were screened using environmental criteria	44.74%	41.18%
	308-2 Negative environmental impacts in the supply chain and actions taken	0.00%	5.88%

Source: Author's calculations

Australian companies have highest sub-indicator disclosure transparency scores for scope 1 emission, scope 2 emissions (both have 81.58% score) followed by scope 3 emissions and reduction of GHG emissions (both 71.05% score). Indian companies also similar sub-indicator take precedence over others - scope 1 emission, scope 2 emissions and reduction of GHG emissions. All three have 58.82% score.

Now moving to least disclosed sub-indicators – for Australian companies - Materials used by weight or volume; Energy consumption outside of the organization, Emissions of ozone-depleting substances (ODS) and Negative environmental impacts in the supply chain and actions taken. All four of them have 0% score. In case of Indian companies least disclosed Emissions of ozone-depleting substances (ODS) (0%), Reclaimed products and their packaging materials and Waste generation (2.94%) and significant waste-related impacts (2.94%).

Discussions

The Materials indicator captures data regarding material usage in terms of weight or volume, integration of recycled input materials, and the utilization of reclaimed products along with their accompanying packaging materials. This approach reflects a collective endeavor to promote sustainable resource management across diverse industries. Nevertheless, as highlighted by certain companies during their reporting for this indicator, the company in question is actively engaged in the realm of real estate development, encompassing the entire lifecycle of real estate assets, from construction to operation and maintenance. The company's portfolio comprises the construction of residential properties as well as the establishment, operation, and upkeep of commercial office spaces, retail outlets (shopping malls), and hospitality establishments (hotels and clubs). As a result, the notion of utilizing reclaimed products and their associated packaging materials does not align with the scope of the company's activities. Similar disclosures have also been noted from other stakeholder groups as well.

Carbon emissions are assessed through scope 1, scope 2, and scope 3 greenhouse gas emissions. Presently, it has become customary to report these emissions due to the enhanced clarity in calculation methods and the availability of third-party validations. This convergence of factors renders carbon emissions a more convenient metric for measurement. Emissions have consistently held significance and have often been equated with the broader regime of environmental activities. This is evident in the disclosure scores, where the Emissions indicator attains the highest disclosure scores.

Numerous companies have emphasized the challenges associated with reporting sub-indicators concerning Energy and Water and effluents. The primary reason is the nature of the property arrangement; as many properties are rented rather than owned, installing proprietary measuring units to accurately record these indicators is often unfeasible. Nonetheless, these companies acknowledge their efforts to capture these indicators with the highest possible precision wherever circumstances allow. Consequently, this circumstance could contribute to the relatively lower priority placed on water-related matters or the potential inability to fully disclose information tied to this particular indicator.

Waste generation for developers is an issue – they can actually use some of the waste as raw material inputs – which is captured by Materials indicator (interlinkage of 2 different indicators) – In India, Godrej Properties Limited is using 94.44% of construction waste as “recycled input materials used”. DLF Ltd also uses Fly ash 2.22%; Ground Granulated Blast Furnace Slag used in RCC and PCC works 0.27% and Steel scrap 0.01%.

Supplier evaluation is an area that often receives limited emphasis. This can be attributed to the fact that suppliers are external entities. Amongst stakeholders, developers and providers of raw materials are the groups more likely to prioritize this aspect. Many of these companies implement supplier codes of conduct and policies to facilitate supplier screening. On the other hand, stakeholders like financial institutions, international property consultants, and facility management firms don't typically need to procure raw materials on such a significant scale. Hence, their focus on this indicator might not be as pronounced.

Policy Implications

The strong focus on emissions, while essential, may overshadow other vital environmental aspects. The assessment underscores that certain indicators have not yet received the requisite attention to fully satisfy the overarching criteria of climate change and other environmental aspects. A more balanced approach to disclosure that includes Materials, Waste, Water and Effluents, and Biodiversity could provide a more comprehensive view of the sector's environmental impact. The alignment of disclosure practices with global frameworks like TCFD emphasizes the importance of integrating international guidelines into national reporting practices. This alignment fosters consistency and comparability across markets. The data suggests that disclosure practices are influenced by the specific roles and responsibilities of different stakeholder groups. Tailoring sustainability strategies to these roles could enhance effectiveness and relevance. The differences between Australia and India highlight the importance of considering local environmental priorities, regulations, and cultural factors in shaping disclosure practices. The least disclosed sub-indicators point to areas where transparency could be enhanced. Addressing these gaps would contribute to a more transparent and accountable real estate sector.

The analysis of environmental disclosure practices within the real estate sector highlights key policy implications for developers, REITs, suppliers, and financial institutions. For developers and REITs, the focus on waste disclosures calls for strengthened waste management regulations, incentives for sustainable materials usage, and comprehensive environmental reporting guidelines. Suppliers could be guided by energy efficiency standards, transparency requirements in the supply chain, and collaboration with industry bodies to develop best practices. Financial institutions should align with global frameworks like TCFD, promote green financing initiatives, and implement guidelines for assessing climate-related financial risks.

Governments and regulatory bodies in Australia and India have a role in shaping these policies, with opportunities to develop harmonized environmental reporting standards, incentivize balanced disclosure, and establish monitoring and enforcement mechanisms. These policy directions are tailored to the unique roles and responsibilities of each stakeholder group, addressing the specific focus areas identified in the analysis. They provide a roadmap for enhancing transparency and

sustainability within the real estate sector, reflecting the complex interplay of emissions, materials, energy, and waste, and aligning with broader environmental goals and global standards.

Conclusions and future research

The real estate sector's role in environmental sustainability has led to this study's exploration of environmental disclosure practices among key stakeholders, including developers, REITs, suppliers, and financial institutions in Australia and India. Findings highlight a consistent focus on emissions but varying attention to other aspects like materials, waste, energy, and water. This complexity underscores the need for a nuanced approach to disclosure, reflecting the unique roles and contexts of different stakeholders.

In conclusion, this research provides valuable insights into the multifaceted nature of environmental disclosure within the real estate sector. The derived policy implications offer a pathway towards more transparent and sustainable practices, emphasizing the importance of balanced reporting. Future research should delve into the underlying drivers of disclosure practices, regulatory impacts, and emerging technologies, fostering collaboration across academia, industry, and policymakers.

This study lays the groundwork for further exploration, contributing to the ongoing dialogue on responsible development and global stewardship within the real estate landscape. It calls for concerted action towards a more sustainable and transparent future, aligning the real estate sector with broader environmental goals.

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Annexure – A

Australia

Australia Developers and Suppliers Disclosure Transparency Score Matrix

Sub-indicators	Developers					Suppliers				
	Goodman Group	Scentre Group	Vicinity Centres	Stockland Corporation Ltd	Mirvac Group	James Hardie Industries plc	Boral Limited	Brickworks Limited	CSR Limited	Adbri Limited
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	1	1	1	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	1	1
302-1 Energy consumption within the organization	0	0	1	1	1	1	1	1	1	1
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	0	0	1	1	1	1	0	1	0	0
302-4 Reduction of energy consumption	0	0	1	1	1	1	1	1	0	0
302-5 Reductions in energy requirements of products and services	0	0	0	0	0	0	1	1	0	0
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0
303-2 Management of water discharge-related impacts	0	1	0	1	1	1	1	1	1	1
303-3 Water withdrawal	0	0	0	0	0	1	0	0	0	0
303-4 Water discharge	0	0	0	0	0	1	0	0	0	0
303-5 Water consumption	0	1	1	1	1	1	0	1	1	1
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	1	0	1	0	0	1	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	0	0	1	0	1	1	0	1	1
304-3 Habitats protected or restored	0	0	0	1	0	1	1	1	1	1
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	1	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	1	1	1	1	1	1	1
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	1	1	1	1	1	1	1

305-3 Other indirect (Scope 3) GHG emissions	1	0	1	1	1	1	1	1	1	0
305-4 GHG emissions intensity	0	0	1	1	0	0	0	0	1	0
305-5 Reduction of GHG emissions	1	1	0	1	1	1	1	1	1	1
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	0	0	0	0	1	0	0
306-1 Waste generation and significant waste-related impacts	0	0	1	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	1	1	1	1	1	1	1
306-3 Waste generated	0	0	1	1	1	1	1	0	0	0
306-4 Waste diverted from disposal	0	1	1	1	1	1	1	0	0	0
306-5 Waste directed to disposal	0	0	1	1	1	1	1	0	0	1
308-1 New suppliers that were screened using environmental criteria	0	1	1	0	0	0	0	1	0	1
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0

Australia REITs, Facility Management and International Property Consultants Disclosure Transparency Score Matrix

Sub-indicators	REITs				Facility Management					International Property Consultants				
	Goodman Group	Scentre Group	Vicinity Centres	Stockland Corporation Ltd	Mirvac Group	CBR E	ISS Australia	Jones Lang LaSalle	CBR E	Jones Lang Lasalle	Colliers	Cushman & Wakefield	Knight Frank	
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0	0	0	0	0	
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0	0	0	0	0	
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	0	0	0	0	
302-1 Energy consumption within the organization	0	0	1	1	1	1	0	1	1	1	1	1	0	
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0	0	0	0	
302-3 Energy intensity	0	0	1	1	1	1	0	1	1	1	1	1	0	
302-4 Reduction of energy consumption	0	0	1	1	1	0	0	1	0	1	0	0	0	
302-5 Reductions in energy requirements of products and services	0	0	0	0	0	1	0	0	1	0	1	0	0	
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0	0	1	0	

303-2 Management of water discharge-related impacts	0	1	0	1	1	0	0	1	0	1	1	1	0
303-3 Water withdrawal	0	0	0	0	0	1	0	0	1	0	0	1	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0	0	0	0	0
303-5 Water consumption	0	1	1	1	1	0	0	1	0	1	0	0	0
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	1	0	1	0	0	0	1	0	1	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	0	0	1	0	0	0	1	0	1	0	0	0
304-3 Habitats protected or restored	0	0	0	1	0	0	0	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	1	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	1	1	1	1	1	1	1	1	1	0
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	1	1	1	1	1	1	1	1	1	0
305-3 Other indirect (Scope 3) GHG emissions	1	0	1	1	1	1	1	1	1	1	0	1	0
305-4 GHG emissions intensity	0	0	1	1	0	0	0	0	0	0	1	1	0
305-5 Reduction of GHG emissions	1	1	0	1	1	1	1	1	1	1	1	1	0
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	0	0	0	0	0	0	0	1	0	0
306-1 Waste generation and significant waste-related impacts	0	0	1	0	0	0	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	1	1	1	1	1	1	1	0	0	0
306-3 Waste generated	0	0	1	1	1	0	0	1	0	1	0	1	0
306-4 Waste diverted from disposal	0	1	1	1	1	0	0	1	0	1	0	1	0
306-5 Waste directed to disposal	0	0	1	1	1	0	0	1	0	1	0	1	0
308-1 New suppliers that were screened using environmental criteria	0	1	1	0	0	1	0	1	1	1	0	1	0
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0

Sub-indicators	Financial Institutions														
	Common		National Australia Bank Ltd	Australia and New Zealand Banking Group Limited (ANZ)	Bank of Queensland Ltd	AMP	Macquarie Infrastructure and Real Asset	Blackstone	KK R & Co. Inc.	TPG Capital	Future Fund Australia	Bain Capital	IFM Investors	Common	
	wealth bank of Australia	Westpac Banking Corp		Investors		wealth bank of Australia								Westpac Banking Corp	
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	1	1	1	1	1	0	0	0	1	0	1	0	0	0	1
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
302-4 Reduction of energy consumption	0	0	1	1	1	0	0	1	0	0	0	1	0	0	0
302-5 Reductions in energy requirements of products and services	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-2 Management of water discharge-related impacts	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0
303-3 Water withdrawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-5 Water consumption	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

304-2 Significant impacts of activities, products and services on biodiversity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
304-3 Habitats protected or restored	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	1	1	1	0	1	0	1	0	1	0	1	
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	1	1	1	0	1	0	1	0	1	0	1	
305-3 Other indirect (Scope 3) GHG emissions	1	1	1	1	1	1	0	1	0	1	0	1	0	1	
305-4 GHG emissions intensity	0	0	0	0	1	0	0	0	0	0	0	0	0	0	
305-5 Reduction of GHG emissions	0	1	1	1	1	1	0	0	0	0	0	1	1	0	
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
306-1 Waste generation and significant waste-related impacts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
306-2 Management of significant waste-related impacts	1	0	0	1	0	0	0	1	0	0	0	1	0	1	
306-3 Waste generated	1	1	1	1	0	0	0	0	0	0	0	0	0	1	
306-4 Waste diverted from disposal	1	1	1	1	0	0	0	0	0	0	0	0	0	1	
306-5 Waste directed to disposal	1	1	1	1	0	0	0	0	0	0	0	0	0	1	

308-1 New suppliers that were screened using environmental criteria	1	1	0	1	1	0	1	0	0	0	0	0	0	1
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0	0

India

India Developers and Suppliers Disclosure Transparency Score Matrix

Sub-indicators	Developers						Suppliers			
	DLF Limited	Godrej Properties Ltd	Sobha Ltd	Omaxe Ltd	Mahindra Lifespace Developers Ltd	UltraTech Cement Ltd	Visa Steel Ltd	RDC Concrete (India) Pvt Ltd	Volve Construction Equipment	Asa Ind Gla Ltd
301-1 Materials used by weight or volume	0	0	0	0	0	0	1	0	0	0
301-2 Recycled input materials used	1	1	0	0	0	0	1	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	0	1	0	0	1	1	1	0	0	1
302-2 Energy consumption outside of the organization	0	1	0	1	0	0	0	0	0	0
302-3 Energy intensity	1	1	0	0	1	1	1	0	0	0
302-4 Reduction of energy consumption	1	1	1	0	1	1	1	0	0	1
302-5 Reductions in energy requirements of products and services	1	1	0	0	1	1	1	0	0	1
303-1 Interactions with water as a shared resource	1	1	0	0	1	1	0	0	0	0
303-2 Management of water discharge-related impacts	1	1	1	1	1	1	1	0	0	0

303-3 Water withdrawal	1	1	0	1	1	1	0	0	0
303-4 Water discharge	0	0	0	1	1	0	0	0	0
303-5 Water consumption	1	1	0	1	1	1	0	0	1
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	1	1	0	1	1	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	1	0	0	0	1	0	0	1
304-3 Habitats protected or restored	0	0	0	0	1	1	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	1	0	0	1	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	0	1	1	1	0	0	1
305-2 Energy indirect (Scope 2) GHG emissions	1	1	0	1	1	1	0	0	1
305-3 Other indirect (Scope 3) GHG emissions	0	1	0	1	1	1	0	0	1
305-4 GHG emissions intensity	1	1	0	1	1	1	0	0	1
305-5 Reduction of GHG emissions	1	1	1	0	1	1	0	0	0
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	1	0	0	0	1	1	0	0	1
306-1 Waste generation and significant waste-related impacts	0	1	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	0	1	1	0	0	1
306-3 Waste generated	1	1	0	0	1	1	0	0	1
306-4 Waste diverted from disposal	1	1	0	0	1	1	0	0	1
306-5 Waste directed to disposal	1	1	0	0	1	0	0	0	1
308-1 New suppliers that were screened using environmental criteria	1	1	1	0	1	1	0	0	1
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	1	0	0	0	1

India REITs, Facility Management and International Property Consultants Disclosure Transparency Score Matrix

Sub-indicators	REITs	Facility Management	International Property Consultants
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	Brookfield India Real Estate Trust REIT	Mindspace Business Parks REIT	Embassy Office Parks REIT	Cushman & Wakefield - Commercial Real Estate Services	Cushman & Wakefield - Commercial Real Estate Services	CBR E	Jones Lang LaSalle	Colliers	Knight Frank
301-1 Materials used by weight or volume	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	1	0	0	1	1	1	1	1	0
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	1	0	0	1	1	1	1	1	0
302-4 Reduction of energy consumption	1	1	0	0	0	0	1	0	0
302-5 Reductions in energy requirements of products and services	0	1	1	0	0	1	0	1	0
303-1 Interactions with water as a shared resource	0	0	0	1	1	0	0	0	0
303-2 Management of water discharge-related impacts	1	1	1	1	1	0	1	1	0
303-3 Water withdrawal	0	0	1	1	1	1	0	0	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0
303-5 Water consumption	1	1	0	0	0	0	1	0	0
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	0	0	0	0	0	0	1	0	0
304-2 Significant impacts of activities, products and services on biodiversity	0	0	0	0	0	0	1	0	0
304-3 Habitats protected or restored	1	0	1	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	0	0	1	1	1	1	1	0
305-2 Energy indirect (Scope 2) GHG emissions	1	0	0	1	1	1	1	1	0
305-3 Other indirect (Scope 3) GHG emissions	0	0	0	1	1	1	1	0	0
305-4 GHG emissions intensity	0	0	0	1	1	0	0	1	0
305-5 Reduction of GHG emissions	1	0	1	1	1	1	1	1	0

305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
306-1 Waste generation and significant waste-related impacts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	1	1	0	0	1	0	0	1	1	0	1	1	0	0	0	0	0
306-3 Waste generated	1	0	0	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0
306-4 Waste diverted from disposal	0	0	1	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0
306-5 Waste directed to disposal	0	0	0	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0
308-1 New suppliers that were screened using environmental criteria	0	1	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0	0
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

India Financial Institutions Disclosure Transparency Score Matrix

Sub-indicators	Financial Institutions																
	HDF C Bank Ltd	State Bank of India	PNB Housing Finance Ltd	LIC Housing Finance Ltd	ICICI Bank Ltd	ICICI Venture Funds Management Company	Kotak Private Equity Group	Blackstone	KKR & Co. Inc.	Motilal Oswal Alternates	New York Life Insurance Company	The Canada Pension Plan Investment Board	Temasek's Mapletree	Caisse de dépôt et placement du Québec	Ontario Teachers' Pension Plan Board		
301-1 Materials used by weight or volume	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-2 Recycled input materials used	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301-3 Reclaimed products and their packaging materials	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
302-1 Energy consumption within the organization	1	1	1	0	1	0	0	0	0	1	1	0	1	0	0	0	0
302-2 Energy consumption outside of the organization	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
302-3 Energy intensity	1	1	1	0	1	0	0	0	0	1	1	0	1	0	0	0	0
302-4 Reduction of energy consumption	1	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0

302-5 Reductions in energy requirements of products and services	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
303-1 Interactions with water as a shared resource	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-2 Management of water discharge-related impacts	1	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0
303-3 Water withdrawal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-4 Water discharge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-5 Water consumption	1	1	1	0	0	0	0	0	0	1	1	0	1	0	0	0
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
304-2 Significant impacts of activities, products and services on biodiversity	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
304-3 Habitats protected or restored	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
305-1 Direct (Scope 1) GHG emissions	1	1	1	0	1	0	0	1	0	0	1	1	1	1	0	0
305-2 Energy indirect (Scope 2) GHG emissions	1	1	1	0	1	0	0	1	0	0	1	1	1	1	0	0
305-3 Other indirect (Scope 3) GHG emissions	1	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0
305-4 GHG emissions intensity	1	1	1	0	1	0	0	0	0	0	0	0	1	1	1	0
305-5 Reduction of GHG emissions	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	1
305-6 Emissions of ozone-depleting substances (ODS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
306-1 Waste generation and significant waste-related impacts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
306-2 Management of significant waste-related impacts	1	0	1	1	0	0	0	1	0	1	1	0	1	0	0
306-3 Waste generated	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0
306-4 Waste diverted from disposal	1	1	0	0	0	0	0	0	0	1	1	0	1	0	0
306-5 Waste directed to disposal	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
308-1 New suppliers that were screened using environmental criteria	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
308-2 Negative environmental impacts in the supply chain and actions taken	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Non-Peer Reviewed*

Macroeconomic Dynamics and the Causal Effect on Residential Real Estate Investment Returns in Abuja and Lagos, Nigeria

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Abstract

This study evaluated the performance of residential real estate investment and the causal linkages between important macroeconomic variables and real estate investment returns in Abuja and Lagos cities in Nigeria. A survey research design was employed using questionnaire to collect real estate transaction data from 2008 to 2022 from estate surveying and valuation firms in the study areas. The macroeconomic data used were retrieved from the archives of the Central Bank of Nigeria and National Bureau of Statistics. The rental and capital value data collected were used to construct rental and capital value indices using index number model and total returns on investment using holding period return model. Granger Causality test was employed to determine the causal effect of macroeconomic factors on residential real estate returns in the study areas. The finding of this study revealed among others that there was a progressive upward movement in rental and capita values of residential real estate investment in the study areas between 2008 and 2022. On the basis of total return and risk-adjusted return performances, residential real estate performed slightly better in Lagos with an average total return of 15.28% as against 15.20% in Abuja. On the other hand, Abuja performed better in terms of risk-adjusted return. Of the six macroeconomic variables analysed, only inflation rate, unemployment rate and real GDP per capita were found to have statistically significant causal effect on residential real estate investment returns in the study areas. The study recommended that whereas it is profitable for investors to invest their money in residential real estate in the study areas due to the positive rental and capital value growth potential, the government should implement economic policies that are capable of ameliorating the high rate of inflation and unemployment in the study areas.

Keywords: Macroeconomic variables; Modified value at risk; Performance; Real estate investment; risk-adjusted returns

Introduction

The increasing urbanisation across the world and its attendant implication has triggered the demand for land and landed properties or real estate. There is a continuous rising demand for spaces for human habitation, interaction and economic activities. Real estate has been adjudged as the largest store of the world's wealth and which plays a significant role in the development of a country's economy (Abidoye and Chan, 2016; Garay, 2016; Trung and Quan, 2019).

Over the years, real estate as an investment asset, has continued to draw increasing attention from investors around the world as one of the best investment assets existing (Yong and Pham, 2015; Ekwebelem and Emoh, 2020). Thus real estate investment has become the largest investment sector, especially in emerging economies of the world (Irene and Zubair, 2015). As stated by Wyatt (2013), the real estate market does not operate in isolation rather, it is influenced by movements in the economy as a whole and in the financial markets in particular; knowing this will facilitate more informed judgement about rental and capital values, rental growth, investment and occupier demand and development activity.

The real estate market is an imperfect and dynamic one thereby making investment decision a complex human cognitive process with regard to investment returns, risks and the factors that influence the real estate market. Understanding the macroeconomic variables that influence real estate prices as well as returns is expected to guide existing and potential investors in order to safeguard against potential loss of investment returns or capital invested. In literature, the factors responsible for the gap between demand and supply of real estate are known. They can be categorised into property-specific or physical factors, economic (microeconomic and macroeconomic) factors, political factor and social factors.

One of the most essential considerations in real estate investment analysis and decision making is the measure of investment performance alongside the factors that drive this performance. It is therefore important that real estate practitioners and investors alike monitor these key macroeconomic indicators and understand how their movements may influence real estate investment returns performance in different locations.

However, Elile et al. (2019) noted that little empirical evidence on the extent to which major macroeconomic variables, such as exchange rate, inflation rate, money supply, and unemployment rate, influences real estate performance is known. Specifically, studies that examine the effect of major macroeconomic variables on residential real estate investment returns in Nigeria are very few and limited in scope (Bello et al., 2020; Ekwebelem and Emoh, 2020). Whereas it is popularly believed that investing in real estate offers a substantial profit, real estate investment decision is not well understood by many investors in Nigeria (Salihu et al., 2020). In Nigeria, investors still engage in real estate investment relying on information obtained through informal market comparison, intuition or rule-of-thumb (Oyewole, 2013; Salihu et al., 2020).

Additionally, Oyewole (2013), Olowofeso (2019) and Salihu et al. (2020) have argued that the various studies conducted on real estate market of various countries could not be generalised to all countries and regions with differing property market environments but rather had to be considered separately for each country or region. The aim of this study, therefore, is to evaluate the effect of the variations in macroeconomic indices on residential real estate investment returns in Abuja and Lagos with a view to guiding potential and existing real estate investors (both in and outside Nigeria) and practitioners. The study's aim will be achieved through:

examining the trends in rental and capital values of residential property investment in Abuja and Lagos;

analysing the total return performance of residential real estate investment in the study areas; and

evaluating the significant macroeconomic factors that influence residential real estate investment returns in the study areas.

The Study Areas at a Glance

Nigeria is the most populous country in the continent of Africa with an estimated population of about 213 million people in 2021 (World Bank, 2022). It is therefore the largest real estate market in Africa. Also, in 2021, the World Bank put the Nigeria’s GDP at about 441.5 billion U.S. dollars; again, the highest in Africa. The Nigerian Population has been a driving factor for the real estate market, particularly in Abuja, the capital city (Fig 1). Since the movement of the administrative capital from Lagos (Fig. 2) in 1991, the population and economic activities of the city have continued to grow constantly. With population of about 6 million people, Abuja real estate market is fast growing and arguably becoming one of the largest real estate markets in Nigeria, after Lagos thus, attracting high inflow of direct foreign investment (DFI) from institutional investors.

Residential real estate forms a substantial real estate investment proportion Abuja and Lagos but the drivers of residential real estate investment returns in this cities has not been well researched. Particularly, there is need for empirical study that will unravel the effect of important macroeconomic variables on residential real estate investment returns in these important cities where residential investment assets are believed to be thriving. According to a survey by Northcourt (2022), Abuja and Lagos have the fastest growing real estate market in Nigeria. Both indigenous and foreign investors are continually committing funds to residential real estate to benefit from the increasing demand for housing in these cities.

Fig. 1:



Nigeria showing Abuja



Fig. 2: Nigeria showing Lagos

Review of Literature on Macroeconomic Variable Effects on Real Estate Investment

Real estate market is one of the important input resources markets of the national economic system. This market has its own characteristics different from other input resource markets because,

according to Foldvary and Jaffe (2010), the real estate market is developed on land with distinctive characteristics, supply and demand for real estate are less elastic compared to prices and the operation of the real estate market is subject to government policies and control.

The macroeconomic environment of any given nation no doubt has significant impact on real estate investment performance which in turn influences real estate investment decision-making among existing and potential investors. Favourable macroeconomic conditions may not only create favourable conditions for investment projects to come into existence and operate effectively but also, to a certain extent, the performance of investment.

The performance of real estate in any given country depends largely on enhanced economic activity and the growth of that country. Wyatt (2013) observed that the decision to develop or acquire and own real estate assets for purpose of investment requires an assessment and understanding of the current and future macroeconomic conditions of the real estate market. The key macroeconomic indicators, according to Wyatt (2013), include gross domestic product, trade deficit, tax-to-GDP ratio, inflation, employment and unemployment figures, oil prices, house prices, household debt and debt as a percentage of income. As identified by Tze (2013); Trung and Quan (2019), inflation rate, employment/unemployment rates, interest rate on loan, exchange rate, government monetary policy, balance of payment and per capita real gross domestic product as major macroeconomic factors that influence real estate investment. If interest rates rise sharply, for instance, consumer spending tends to decline and the demand for real estate reduces and, in some instances, may even become surplus to requirements.

A productive economy is expected to have a positive influence on the demand for and supply of real estate assets. Elile et al. (2019) submitted that a sound economic structure and an expected strong and stable economy are perceived to be the most significant factors in the ability of a region to attract foreign real estate investments. Real estate investment is equally susceptible to external influences and government intervention in the form of planning, environmental controls, buildings regulations, rent control, security of tenure add to management obligations and affect value (Trung and Quan, 2019). Investment managers and investors therefore use macroeconomic conditions to make decisions on real estate investment both at regional and national levels.

As observed by Okumu (2015), the research and evaluation of macroeconomic conditions are important in the process of making and managing investment projects. Trung and Quan (2019) recommended that investors should keep in mind when conducting the macroeconomic environment assessment on the characteristics of regional real estate market participants, real estate market conditions in the region, annual GDP growth rate of the country, the average annual inflation rate, exchange rate, employment and unemployment rates.

The extent to which macroeconomic indicators influence the rate of return of the United States' income generating property market was investigated by Kofoed-Pihl (2009) using un-smoothed transaction-based return index error correction regression model. This was developed to analyse the macroeconomic determinants of the quarterly real estate total returns from 1984-2008. The study discovered that unemployment and the long-term interest rate negatively influenced the total

return of the US real estate market, while the gross domestic product over time heavily influences the total return positively. However, noticeable impact of inflation effect was not found on the return which revealed the importance of timing the real estate investments.

Fleming (2010) examined the macroeconomic factors that determine commercial real estate performance in the United States of America. The study used property transaction data and macroeconomic variables such as unemployment rates, Gross Domestic Product (GDP), interest rates, commercial real estate overall inventory and vacancy rate. The study adopted a stepwise multiple linear regression to assess the impact of these macroeconomic variables on commercial real estate prices and vacancy rate. The findings of the study suggested that vacancy rates were significantly influenced by unemployment, Gross Domestic Product decline and location.

Muli (2013) investigated the factors affecting the growth in real estate investment in Kenya. The effects of factors such as GDP growth, interest rate, inflation rate and population growth on real estate investment were examined. Data collected through questionnaire survey and secondary sources were analysed using correlation and regression models. The finding of the study confirmed that GDP, inflation rate and interest rate were the major factors affecting real estate investment growth in Kenya. It was further revealed that population growth has the least effect on real estate investment growth.

Grum and Govekar (2016) examine the macroeconomic factors that are significantly associated with property prices among; unemployment, share index, current account of a country, industrial production and gross domestic product in relation to the different cultural environments of Slovenia, Greece, France, Poland, and Norway. The study adopted the Spearman correlation analysis and found that there was statistical significant relationship between the prices of residential real estate and the selected macroeconomic variables in different ways.

Trung and Quan (2019) gave detailed classification of the factors that influence real estate performance to include natural, economic, market, legal, political and macroeconomic factors. This was part of the finding of their study on the effect of the factors influencing real estate investment in Ho Chi Minh City, Vietnam. Primary and secondary were collected through survey method for the period January 2019 to July 2019. The data was tested for internal consistency using Cronbach's Alpha. The exploratory factor analysis (EFA) and multiple linear regression technique were used to further analyse the data. The findings of the study indicated that the six factors affect real estate investment in the study area with significance level 0.05.

In Nigeria, few related studies have been carried out in this field. The determinants of commercial property rental growth in Minna were examined by Udoekanem et al. (2014). The study adopted survey research design. Primary and secondary data were used for the study. Primary data obtained for the study include office rental levels and office space data in the study area for the period, 2001-2012. Secondary data obtained for the study are mainly macroeconomic variables in Nigeria for the period, 2001-2012. Granger causality and Augmented Dickey Fuller Unit root tests statistical techniques were used for data analysis. The study found that real GDP growth and

vacancy rate were the major drivers of rental growth in the office property market in Minna, accounting for about 83% of the variation in office property rents.

Udoekanem et al. (2015) investigated the major drivers of office rents in Asokoro, Maitama and Utako in Abuja. The office rental values and office space data for the period from 2001 to 2012 were obtained using structured questionnaires which were administered to active estate surveying and valuation firms in the study areas. Secondary data were retrieved from National Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN). Using regression analysis, the developed office rent model accounted for 76%, 72% and 75% of the variation in office property rents in the commercial property market of the Asokoro, Maitama and Utako districts respectively. The study further revealed that real GDP growth and vacancy rate are the major determinants of rental growth in the office property market in the districts of Asokoro and Maitama, while real GDP growth is the major driver of office rents in the Utako district. The study only covered office property, among the commercial property categories.

The factors influencing investment performance of commercial property in Lagos were examined by Anule and Umeh (2016). Structured questionnaire was used to seek the opinions of real estate practitioners in Lagos on the factors influencing commercial property performance in the area. The responses were analysed using the mean item score and the principal component analysis. The result of the study revealed that the top factors common to each location were cost of building materials, location, quality of road infrastructure, rental growth and security. Findings across submarkets also revealed three critical set of factors; condition of the premises, a mixture of socio-cultural and legal framework and a mixture of socio-cultural, political and economic factors. Although the study expanded previous work from one location to five, the study is limited to only commercial property.

Olatunji et al. (2017) examined the influence of macroeconomic factors on residential property returns in Abuja using a survey research methodology. Primary data used to calculate returns were rental value and sales and secondary data were annual macro-economic indicators from 2001 to 2015. These indicators were real GDP, interest rate, unemployment rate, employment rate, exchange rate and inflation rate. The Augmented Dicker Fuller test, regression and Granger Causality test were the analytical tools adopted to analyse the gathered data. The results of the analyses suggested an existence of longrun relationship between macroeconomic factors and residential property returns. The result of co-integration regression suggested further that between 18.2% and 83.6% and 16.2% and 79% variation in 3-Bedroom and 4-Bedroom property returns respectively across seven out of twelve residential markets were significantly influenced by macroeconomic indicators.

Elile et al. (2019) conducted a study to examine the macroeconomic determinants of real estate investment performance in Nigeria. The study adopted quantitative research method and used secondary data for the period of 37 years (1980-2017). The analysis was performed using Ordinary Least Square multiple regression. The findings of the study revealed that inflation, and real per capita each has significant positive effect while exchange rate has significant negative effect on

real estate sector performance. They concluded that inflation, real per capita and exchange rate are important macroeconomic determinants of real estate performance in Nigeria. The study however ignored other factors such as property-specific factors and neighbourhood factors that could influence real estate investment performance significantly.

Olowofeso (2019) carried out an assessment of the factors influencing the growth of real estate investment in Lagos, Nigeria. The author gathered primary data from real estate professionals' practice in Lagos State. Fifteen variables were identified as factors that influence the growth of real estate practice. The data collected were analysed using principal component analysis (PCA) with varimax rotation. The result of the analysis showed that three factors account for about 67% of the total variance. Factors such as innovation, education background and experience of real estate practitioners were the most significant factors that influence the growth of real estate investment in the study area.

Ekwebelem and Emoh (2020) examined the effect of macroeconomic factors on residential real estate performance in Abuja metropolis. The study employed a survey approach to collect data on rent and sale prices from 2001 to 2015 of selected residential properties in the portfolios of registered estate surveying and valuation firms in Abuja. The result of the analysed data revealed that Gwarimpa residential property market outperformed other selected property markets in Abuja. Only the macroeconomic variables affecting the performance of 3- and 4-bedroom residential property types were studied thus, there is need to broaden the scope of the study.

Research Methodology

This study adopted a survey research design using quantitative data. The study population comprised of residential properties that have been built for investment purpose as contained in portfolios of estate surveying and valuation firms operating in Abuja and Lagos. The sampling units were the target residential property categories and the estate surveying and valuation firms in the study areas with records of residential property transaction data on rental and capital/sales values ranging from 2008 to 2022. Stratified and simple random sampling techniques were used for the selection of the neighbourhoods included in the survey across the selected cities. Using these techniques, each of the cities was divided into four strata of high density, medium density, low density and suburb neighbourhoods, using the respective street maps of Abuja and Lagos metropolis. Thereafter, a neighbourhood was randomly picked from each stratum across the cities. Thus, four neighbourhoods were selected from each city making a total of eight neighbourhoods in all.

While the simple random sampling technique was used to select the estate surveying and valuation firms (ESVFs), the purposive sampling technique was on the other hand used to select the residential properties with the required characteristics as contained in the property management files of the sampled ESVFs in the study areas. From the Nigerian Institution of Estate Surveyors and Valuers (NIESV) firms directory 2022 update, there was a total of 184 registered ESVFs in Abuja and 418 registered ESVFs in Lagos. This formed the sampling frame. The Frankfurt-

Nachmias sample size model given in Equation 1 was used to determine the sample size of estate surveying and valuation firms in Abuja and Lagos where the required data were collected.

$$n = \frac{Z^2 pqN}{e^2(N-1) + Z^2 pq} \quad (1)$$

Where:

n = required sample size; N = population size; p = sample population estimated to have the characteristics being measured (in this study, 95% confidence level of the target population);

$q = 1 - p$; e = margin of error and $Z = 1.96$ (being the standard normal deviation at 95% confidence level).

Using the above sampling formula, 58 ESVFs were randomly sampled in Abuja and 64 ESVFs were sampled in Lagos. Primary and secondary data types were used for this study. The specific primary data required were the annual rental values and capital values or sales prices. The primary data were sourced from the sampled ESVFs in the study areas using structured questionnaires. At the end of the questionnaire administration, a total of 417 residential properties with the required characteristics were purposively sampled in Abuja while 502 residential properties were sampled in Lagos. The combined total number of residential properties sampled in all was 919 comprising of different categories of residential apartments such as a-room-self-contained, 1-bedroom, 2-bedroom, 3-bedroom (bungalow and duplex), 4-bedroom (bungalow and duplex) and terrace house. These property transaction data (rental and capital values) retrieved were then reduced to value in Naira per square metre to account for differences in property designs, configurations and other features.

The required secondary data were the major macroeconomic variables that influence residential real estate investment returns identified in the literature reviewed for this study. They are inflation rate, exchange rate, interest rate, unemployment rates, gross domestic product (GDP), and real GDP per capita. These secondary data were retrieved from the archives of the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS) data bases.

The property transaction data were used to construct property values indices for the period under assessment. These indices are the rental value index (RVI) and capital value index (CVI). The RVI model is given as:

$$RVI = \frac{RV_t}{RV_{by}} \times 100 \quad (2)$$

Where RV_t is the rental value of period t (the year under consideration) and RV_{by} is the rental value of the adopted base year (2008)

On the other hand, capital value index was computed using the following model:

$$CVI = \frac{CV_t}{CV_{by}} \times 100 \quad (3)$$

Where CV_t is the capital value of period t (the year under consideration) and CV_{by} is the capital value of the adopted base year (2008)

The annual (year-to-year) rental value growth was calculated using

$$RG_t = \left(\frac{RV_t}{RV_{t-1}} - 1 \right) \times 100 \quad (4)$$

Where RG_t is the rental growth in period t , RV_t is the rental value of period t and RV_{t-1} is the rental value of the preceding year.

Similarly, the annual (year-to-year) capital value growth (CG) was computed using the following model:

$$CG_t = \left(\frac{CV_t}{CV_{t-1}} - 1 \right) \times 100 \quad (5)$$

Where CG_t is the capital growth in period t , CV_t is the capital value of period t and CV_{t-1} is the capital value of the preceding year.

The average annual rental and capital value growths for the study period were calculated using Geometric mean (GM) = $[(1+g_1) \times (1+g_2) \times (1+g_3) \times \dots \times (1+g_n)^{(1/n)}] - 1$ (6)

Where $g_1, g_2, g_3, \dots, g_n$ are the annual growth values for years 1, 2, 3, ... n ; where $n = 15$ for this study.

Total returns on residential real estate investment were computed from the weighted average rental and capital values obtained through the questionnaire survey using the Holding Period Return model as follows:

$$TR_t = \frac{RV_t + (CV_t - CV_{t-1})}{CV_{t-1}} \times 100 \quad (7)$$

Where TR_t is the total return for period t , RV_t is the rental value of period t (year under consideration), CV_t is the capital value of period t and CV_{t-1} is the capital value of the preceding year.

To evaluate the risk and risk-adjusted return performances of residential real estate investment in the study areas, the modified value at risk and modified Sharpe ratio were used respectively as against the use of standard deviation and the traditional Sharpe ratio. The rationale for the adoption of mVaR and mSR as measures of risk and risk-adjusted return performance respectively are based on the submissions of the following authors:

Amedee-Manesme et al. (2017) argued that the traditional Sharpe ratio approach presents some limitations that make it tricky to use despite its popularity among practitioners. Accordingly, possible non-normality of returns is ignored in the traditional Sharpe ratio, and this can cause

investors to invest inappropriately in risky assets. Thus, the statistical properties of real estate returns are mostly non-normal and often unknown, which render many statistical measures useless.

To address the non-normality issue, Favre and Galeano (2002) and Gregoriou and Gueyie (2003) introduced a modification of the traditional Sharpe ratio, the modified Sharpe ratio (mSR), one that takes the Value-at-Risk (VaR) as the risk measure, as was adopted by the Basel II regulation directive. The modified Sharpe ratio makes it possible to overcome the limitations of ordinary Sharpe ratio. In particular, it relies on modified value-at-risk (mVaR), a risk metric that considers the entire distribution of the returns since its computation is based on third and fourth moments of the distribution. Besides, Favre and Galeano (2002) and Gregoriou and Gueyie (2003) concluded that real estate investment risk is usually associated with higher moments such as skewness and kurtosis whereas the standard deviation is calculated based on the first second moment (variance).

The modified Sharpe Ratio (*mSR*) is given as:

$$mSR = \frac{(R_a - R_f)}{mVaR_\alpha} \quad (8)$$

Where: R_a is the average return of the asset or portfolio; R_f is the risk-free rate, and $mVaR_\alpha$ is a modified way of computing value at risk, taking into account skewness and kurtosis of the returns distribution. The geometric mean of the Nigerian 364-days Treasury Bill rate for the study period was taken as the risk-free rate (R_f).

The modified value at risk (mVaR) is computed using a Cornish-Fisher asymptotic expression as follows:

$$mVaR = R_a + [z_c + \frac{1}{6}(z_c^2 - 1)S + \frac{1}{24}(z_c^3 - 3z_c)K - \frac{1}{36}(2z_c^3 - 5z_c)S^2]\sigma \quad (9)$$

Where $Z_c = 1.65$ with 95% confidence level; R_a = expected total return on asset; S and K are skewness and kurtosis respectively and σ = standard deviation.

To examine the causal effect of macroeconomic factors on residential property investment returns in the study areas, the Granger Causality (GC) test model was adopted. Before carrying out the Granger Causality test analysis, the property returns and macroeconomic data sets to be used were tested for stationarity using the Augmented Dickey Fuller (ADF) test of stationarity models. The ADF assumes that the time series data are stationary and if this is not the case, differencing, detrending or other techniques must first be used before using the Granger Causality test. The GC test is based on the following ordinary least square (OLS) regression model:

$$y_i = \alpha_0 + \sum_{j=1}^m \alpha_j y_{i-j} + \sum_{j=1}^m \beta_j x_{i-j} + \epsilon_i \quad (10)$$

Where α_0 is the intercept of the regression line, α_j and β_j are regression coefficients and ϵ_i is the error term.

Results and Discussion

This section presents the results of the data analysis and discussion of the research findings based on the research objectives. The trend in the average rental and capital values as well as the total return performances of the residential property categories were analysed and discussed. The effect of macroeconomic factors on total return for the period under assessment was evaluated.

Rental and capital value performances of residential real estate investment

To examine the rental and capital value performances of residential real estate investment in the study areas, the rental and capital value indices were computed from the weighted rental and capital values, using 2008 as the base year. The results of the analyses are given in Table 1.

Table 1: Rental and capital value indices for residential real estate investment

Year	Abuja				Lagos			
	Weighted Average Rental Value (₦'000/m ²)	Rental Value Index	Weighted Average Capital Value (₦'000/m ²)	Capital Value index	Weighted Average Rental Value (₦'000/m ²)	Rental Value Index	Weighted Average Capital Value (₦'000/m ²)	Capital Value index
2008	3.3340	100	42.0830	100	4.4444	100	48.8850	100
2009	3.5340	106	45.8705	109	4.6700	105	51.3293	105
2010	3.6825	110	48.9897	116	4.9233	111	55.4356	113
2011	3.9402	118	53.3497	127	5.1449	116	59.3161	121
2012	4.2476	127	57.3511	136	5.4536	123	63.4089	130
2013	4.5740	137	60.6773	144	5.7699	130	69.1791	142
2014	5.0000	150	64.1966	153	6.0526	136	73.8141	151
2015	5.4203	163	70.0385	166	6.3733	143	77.8000	159
2016	5.7943	174	77.7427	185	6.8514	154	81.6123	167
2017	6.3042	189	85.5170	203	7.0912	160	86.7538	177
2018	6.6761	200	92.9570	221	7.3748	166	92.8266	190
2019	7.1568	215	101.1372	240	7.7141	174	99.1388	203
2020	7.6220	229	105.6884	251	8.0998	182	109.0563	223
2021	8.2394	247	112.0297	266	8.6019	194	117.3407	240
2022	9.0469	271	123.7928	294	9.1008	205	129.0748	264

Source: Field survey, 2022

These indices were used as proxies for rental value and capital value movements for the fifteen-year period. The result of the analysis revealed a progressive upward increase in both rental and capital value within the study period. Residential properties in Abuja recorded the higher rental and capital value growths compared to Lagos. The all-time rental value increases were 171% and 105% for Abuja and Lagos respectively while all-time capital value increases were 194% for Abuja and 164% for Lagos. This finding is in tandem with the findings of Oyewole (2013); Udoekanem et al. (2014) and Udoekanem et al. (2015).

To determine the rental and capital value growth of residential real estate investment for the period, the year-to-year rental and capital growths were analysed and the results presented in Table 2.

Table 2: Trend in rental and capital value growths in the study areas

Year	Abuja		Lagos	
	Rental Value Growth	Capital Value Growth	Rental Value Growth	Capital Value Growth
2008	0.00	0.00	0.00	0.00
2009	6.00	9.00	5.08	5.00
2010	4.20	6.80	5.42	8.00
2011	7.00	8.90	4.50	7.00
2012	7.80	7.50	6.00	6.90
2013	7.68	5.80	5.80	9.10
2014	9.31	5.80	4.90	6.70
2015	8.41	9.10	5.30	5.40
2016	6.90	11.00	7.50	4.90
2017	8.80	10.00	3.50	6.30
2018	5.90	8.70	4.00	7.00
2019	7.20	8.80	4.60	6.80
2020	6.50	4.50	5.00	10.00
2021	8.10	6.00	6.20	7.60
2022	9.80	10.50	5.80	10.00
GM	6.18	6.62	4.48	6.00

Source: Computed from weighed average rental and capital values in Table 1

The average rental and capital growth rates of residential real estate investment in the study areas were calculated by taking the geometric mean of the growth rates for period under investigation (2008 to 2022). This was considered appropriate since each annual growth rate created a compounding process for the study period. The average rental growth rate for residential real estate in Abuja was 6.18% while the average capital growth rate was 6.62%. These were higher compared to the average rental and capital growth rates for residential real estate in Lagos estimated at 4.48% and 6.0% respectively. The analysis was extended further to visualise the movement in rental and

capital value growths of residential real estate investment from 2008 to 2022 in the study areas. The trend lines are shown in Figures 1 and 2 for Abuja and Lagos respectively.

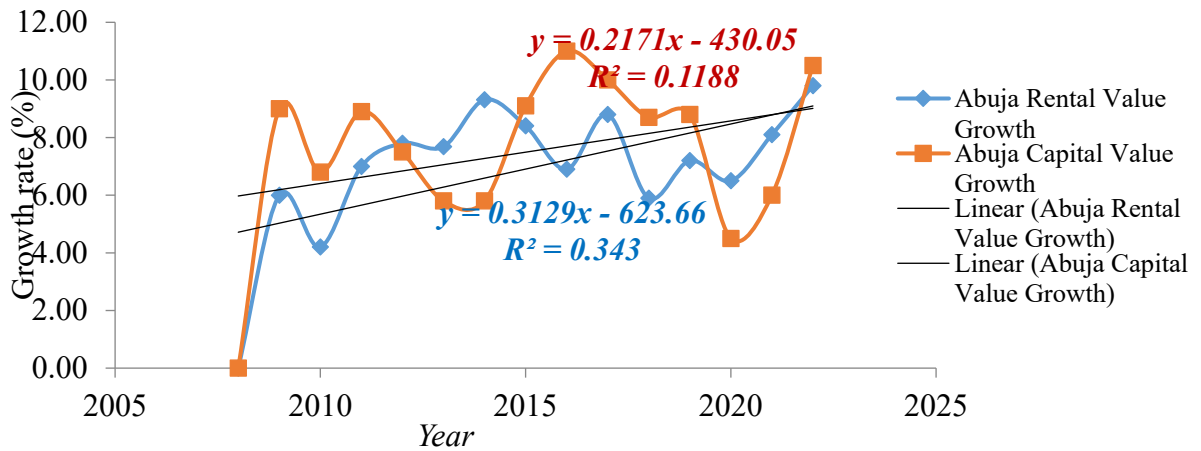


Fig. 1: Rental and capital growth rates for residential real estate investment in Abuja

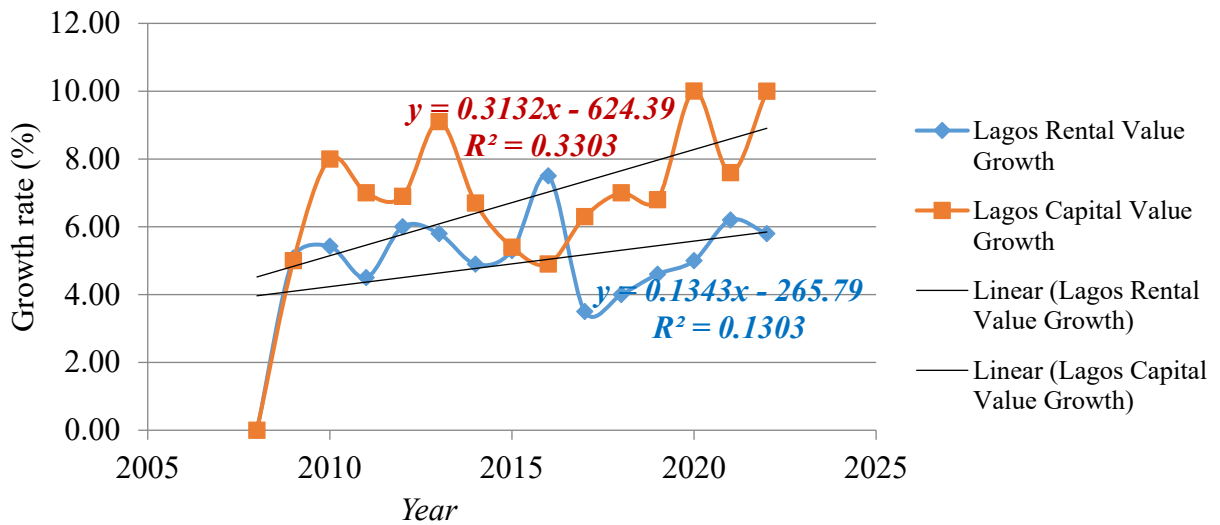


Fig. 2: Rental and capital growth rates for residential real estate investment in Lagos

From the trend analysis, the graphs showed upward trends in both rental and capital growth for residential real estate investment in the two cities. The equations of the smoothed trend line help to predict the future growth in rental and capital values of residential real estate investment in the study areas. The level of reliability of the trend and accuracy of the forecast was determined by the R square values. These were estimated to be 11.8% and 34.0% for rental and capital value growths in Abuja respectively and 13.0% and 33.0% for rental and capital value growths

respectively in Lagos. The OLS regression equations were used for the purpose of predictions. Thus there was evidence of intermittent increase and decrease in the growth of residential real estate rental and capital values within the study period.

Total return, risk and risk-adjusted return performances of residential real estate

The results of the mean total return, risk and risk-adjusted return performances of residential real estate investment in Abuja and Lagos for the study period are presented and discussed in this subsection. Table 3 presents the nominal total returns, associated risks and risk-adjusted returns of residential real estate investment in Abuja and Lagos for the period under assessment.

Table 3: Total return, risk and risk-adjusted return performances.

Year	Treasury Bill Rate (%)	Abuja	Lagos
		Total Return (%)	Total Return (%)
2008	8.2	7.92	9.09
2009	3.8	17.40	14.55
2010	3.8	14.83	17.59
2011	9.7	16.94	16.28
2012	13.6	15.46	16.09
2013	10.8	13.78	18.20
2014	10.5	14.04	15.45
2015	9.4	17.54	14.03
2016	10.1	19.27	13.71
2017	12.3	18.11	14.99
2018	10.1	16.51	15.50
2019	9.6	16.50	15.11
2020	1.6	12.04	18.17
2021	2.2	13.80	15.48
2022	10.6	18.58	17.76
GM	7.22	15.20	15.28
mVaR		9.87	11.05
mSR		0.81	0.73

The average total returns for residential real estate investment in the two cities within the study period were determined using geometric mean (GM) model. On the basis of average total return, Lagos residential real estate market outperformed Abuja residential real estate market with a higher average total return of 15.28% per annum as against 15.20% per annum recorded for Abuja. The modified value at risk (mVaR) was used to gauge the level of risk associated with this type of investment. The higher the mVaR, the higher the risk associated with an investment asset. The

computed mVaR indicated that Abuja had the lower mVaR of 9.87 compared to 11.05 recorded for Lagos. This implied that investing in residential real estate in Lagos attracted more risk compared to Abuja.

Analysis of variance (ANOVA) was carried out to test if there was significance variation between the average total returns on residential real estate investment in the two cities. The result of the analysis is presented in Table 4. The p-value of 0.853 is not statistically significant at 0.05 significant level thus indicating that there was no statistically significant difference between the average total returns on residential real estate investment in Abuja and Lagos within the study period.

Table 4: ANOVA between total returns in Abuja and Lagos

<i>Source of Variation</i>	<i>SS</i>	<i>Df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F critical</i>
Between Groups	0.109	1	0.109	0.034	0.853	4.195
Within Groups	88.542	28	3.162			
Total	88.651	29				

Source: Computed from Table 3

The total returns were adjusted for risk using the modified Sharpe ratio (mSR). Theoretically, the higher the value of the mSR, the better the performance of the investment and the converse is the case. The result of the risk-adjusted returns revealed again that residential real estate investment in Abuja performed better than in Lagos with an mSR of 0.81 as against 0.73 for residential real estate investment in Lagos. According to the Markowitz portfolio theory, investors are risk-averse and would only be ready to embark on an investment with high return with low associated risk. Therefore, the result of this analysis suggested that residential property investment in Abuja comparably performed better than in Lagos.

Effect of macroeconomic variables on residential real estate returns

This subsection presents and discusses the analysis of the effect of macroeconomic variables on the total returns of residential real estate investment in the study area. Table 5 shows the macroeconomic data used for this study.

Table 5: Macroeconomic variable data

Year	Inflation Rate (%)	Exchange Rate (%)	Interest Rate (%)	Unemployment rate (%)	GDP per capita (\$)	real GDP (Billion ₦)
2008	11.5	121	15.1	3.6	2,259	46,320
2009	12.6	162	19.0	3.8	1,912	50,042
2010	13.8	153	17.6	5.1	2,280	54,612
2011	10.9	159	16.0	6.0	2,488	57,511
2012	12.2	161	16.8	10.6	2,724	59,930
2013	8.5	162	16.7	10.0	2,962	63,219
2014	8.1	171	16.5	7.8	3,099	67,153
2015	9.0	223	16.8	9.0	2,688	69,024
2016	15.6	373	16.9	13.4	2,176	67,931
2017	16.5	395	17.6	17.5	1,969	68,491
2018	12.1	361	16.9	22.6	2,028	69,800
2019	11.4	360	15.4	25.2	2,230	71,388
2020	13.2	434	13.6	30.2	2,097	70,014
2021	17.0	478	11.5	32.6	2,085	70,452
2022	18.8	770	18.75	37.7	2,184	74,639

Source: CBN & NBS, 2022

The macroeconomic data were transformed into their corresponding natural logarithms to remove skewness effect on the data and makes it fit for the analysis. Because these data were time series data, they were tested for stationarity for possible presence of unit root using the Augmented Dickey Fuller (ADF) model. The result of the ADF test is presented in Table 6.

Table 6: Stationarity test for macroeconomic variables and total returns

Variables	Computed statistic	ADF	ADF critical value @ $\alpha = 0.05$	Prob.
$\Delta \text{LnAbujaTR}$	-5.3225		-1.6623	0.002
$\Delta \text{LnLagosTR}$	-4.8842		-1.6623	0.006
ΔLnInfR	-6.3451		-1.7448	0.013
$\Delta \text{LnExchR}$	-7.2109		-1.7448	0.000
ΔLnIntR	-3.6780		-1.7448	0.021
$\Delta \text{LnUnempR}$	-5.5103		-1.7448	0.007
$\Delta \text{RealGDP_per_cap}$	-5.3492		-1.7448	0.001
$\Delta \Delta \text{LnRealGDP}$	-4.0042		-1.7448	0.000

Sources: Authors' analysis, 2023

$LnAbujaTR$ = Log of total return on residential real estate investment in Abuja, $LnLagosTR$ = Log of total return on residential real estate investment in Lagos, $LninfR$ = Log of inflation rate, $LnExchR$ = Log of exchange rate, $LnintR$ = Log of interest rate, $LnUnempR$ = Log of unemployment rate, $RealGDP_per_cap$ = Log of real GDP per capita, $LnRealGDP$ = Log of real GDP

The result of the ADF revealed that with the exception of the log of real GDP which was stationary at the second-order difference, other variables tested were stationary at the first-order difference thereby suggesting that the data were fit for the Granger causality test. The result of the Granger Causality test conducted to examine the causal effect of the identified macroeconomic variables on the total returns on residential real estate investment in Abuja and Lagos are presented and discussed in Tables 7 and 8 respectively.

Table 7: Result of Granger Causality test among macroeconomic variables and residential real estate investment returns in Abuja

Null hypothesis	F-statistic	Prob.
$\Delta LninfR$ does not Granger Cause total returns in Abuja	15.1209	0.0215*
$\Delta LnExchR$ does not Granger Cause total returns in Abuja	0.7474	0.8736
$\Delta LnintR$ does not Granger Cause total returns in Abuja	5.9115	0.1017
$\Delta LnUnempR$ does not Granger Cause total returns in Abuja	1.8153	0.0302*
$\Delta RealGDP_per_cap$ does not Granger Cause total returns in Abuja	21.3002	0.0401*
$\Delta \Delta LnRealGDP$ does not Granger Cause total returns in Abuja	6.0081	0.0919

Sources: Authors' analysis, 2023

The Granger Causality analysis result presented in Table 7 suggested that inflation rate, unemployment rate and real GDP per capita are the only macroeconomic variable that have causal effect on real estate investment returns in Abuja that were statistically significant at $\alpha = 0.05$. The causal linkage between exchange rate, interest rate and real GDP and total returns on residential real estate investment in Abuja were not statistically significant.

Table 8: Result of Granger Causality test among macroeconomic variables and residential real estate investment returns in Lagos

Null hypothesis	F-statistic	Prob.
$\Delta LninfR$ does not Granger Cause total returns in Lagos	26.3983	0.0092*
$\Delta LnExchR$ does not Granger Cause total returns in Lagos	1.6754	0.5668
$\Delta LnintR$ does not Granger Cause total returns in Lagos	0.8482	0.0704
$\Delta LnUnempR$ does not Granger Cause total returns in Lagos	5.8941	0.6116
$\Delta RealGDP_per_cap$ does not Granger Cause total returns in Lagos	18.7263	0.0372*
$\Delta \Delta LnRealGDP$ does not Granger Cause total returns in Lagos	6.0812	0.8677

Sources: Authors' analysis, 2023

Granger Causality test was conducted to evaluate the causal linkage between macroeconomic variables and total return on residential real estate investment in Lagos. The analysis revealed that

only inflation rate and real GDP per capita have statistically significant causal linkages between real estate investment returns in Lagos at an Alpha level of 0.05. Thus the causal effect of exchange rate, interest rate, unemployment rate and real GDP on total returns on residential real estate investment in Lagos was not statistically significant. This finding is in consonant with the findings of Udoekanem et al. (2014) and Olatunji et al. (2017)

Conclusion and Recommendations

This study examined the performance of residential real estate investment returns in Abuja and Lagos as well as the effect of basic macroeconomic factors on such returns. The study found that residential real estate investment in Lagos recorded the higher average total return within the study period. It however, recorded the higher risk on investment as determined by modified value at risk. Residential real estate investment in Abuja on the other hand performed better on the basis of risk-adjusted return as indicated by the modified Sharpe ratio. With respect to the causal effect between residential real estate investment returns and macroeconomic variables, only inflation rate, unemployment rate and real GDP per capita had statistically significant effect on residential real estate investment returns in Abuja. In Lagos, only inflation rate and real GDP per capita had statistically significant effect on total return on residential real estate investment. However, the extent or degree of the effect was beyond the scope of this study.

Based on the findings of this study, it is recommended that real estate investors could take advantage of the positive rental and capital value growths in Abuja and Lagos and invest their money in residential real estate. The nominal total returns on residential real estate investment equally looked attractive to potential investors. Finally, this study recommends to the government to formulate and implement economic policies that would address the high unemployment rate and inflation rate in the study areas and Nigeria at large. These macroeconomic variables identified as having a negative causal effect on residential real estate investment returns deprive investors of their ultimate investment goal of maximising returns and minimising risk.

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University of Nairobi

Department of Real Estate, Construction Management & Quantity Surveying (RECM&QS)

The University of Nairobi (UoN), based in Kenya's capital, is the oldest and largest University in the country. It was first founded as the Royal Technical College in 1956 and, after several transformations and name changes, in 1970, it became known as the University it is today. University of Nairobi Rankings include [#794 in Best Global Universities \(tie\)](#) and [#24 in Best Global Universities in Africa](#)

The [Department of Real Estate, Construction Management & Quantity Surveying](#) is based at the Faculty of Built Environment and Design (Formerly part of the College of Architecture and Engineering (CAE), was created through the University of Nairobi Act of 1985.

The mandate of the Department is to train a pool of professionals in the disciplines of quantity surveying, valuation, property and facilities management, land management, construction management, and planning. The goal of training is to facilitate professionals to embrace critical thinking and creativity as modes of research in responding to the needs of the local and international communities.

The Department has existed since 1956 when the Royal College, (presently University of Nairobi) was established. The Royal College was part of the University of East Africa. However, the Department has existed under different names in the various times of existence. Upon its inception, the Department offered Diploma courses allied to the Royal Institute of Chartered Surveyors (RICS), of United Kingdom, and admitted the first bachelor's degrees cohort of students in 1967. Up-to 1990 it was called Department of Land Development, when it split into two sister departments named as Department of Land Development and, Department of Building Economics & Management. In 2005 when there was a university-wide restructuring and formation of schools, the two sister departments were merged into the Department in its current name and as part of Faculty of the Built Environment and Design

The Local Organizing Committee (LOC) of the 22nd AfRES Annual Conference to be held between the : 12th – 15th of September 2023 is made up of members drawn from the Department of Real Estate, Construction Management and Quantity Surveying (DRECM&QS) including but not limited to Professor Washington H. Asembo Olima, Dr. Dennis Mbugua, Lecturer, Catherine Kariuki Lecturer, Dr. Raphael Kieti Lecturer, Dr. Mwenda Makathimo (current external examiner), Dr. Felician Komu (former external examiner), and Mr. Nicky Nzioki, Senior Lecturer, as the Conference Chair.

Email: recmqs@uonbi.ac.ke Website: www.uonbi.ac.ke



Institution of Surveyors of Kenya

The Institution of Surveyors of Kenya (ISK)

The Institution of Surveyors of Kenya (ISK) is a professional organization in Kenya that brings together professionals in land and real estate sector. The professionals fall within eight major disciplines of the surveying profession namely the Valuation, Estate Agency, Property Management, Land Surveying, Building Surveying, Land Administration Management, Engineering Surveying and Geospatial Information Management Systems. The ISK membership currently stands at **over 4,000** spreads throughout the entire Republic of Kenya.

The ISK members operate both in the public and private sectors and are involved in the processes of land delivery, formulation and implementation of land policies and management of land resources in general.

The Institution was established in 1969 and ever since, it has been an active player in the land sector, spearheading land reforms that culminated in the adoption of National Land Policy (2009), the inclusion of Chapter Five of the August 2010 Constitution of Kenya on Land and Environment as well as subsequent consolidation of the various land laws.

Email: info@isk.or.ke

Website: www.isk.or.ke

I am pleased to use this medium to give some information on the Journal of African Real Estate Research's (JARER) progress and the efforts at improving its international recognition and standing. JARER is part of the African Real Estate Society (AfRES) and is published in partnership with University of Cape Town Libraries with support from the International Real Estate Business School at the University of Regensburg, Germany, and the Urban Real Estate Research Unit at University of Cape Town.

JARER is an open-access, peer-reviewed publication that aims at deepening the understanding of African real estate markets and the nature and impacts of research and efforts that seek to improve them. JARER provides valuable resources that support academics and professional researchers in Africa and those interested in African continent. Our journal offers an exciting platform for the dissemination of scholarships and the different types of applied research engaged with in the real estate sector in Africa. The broad issues covered by JARER include real estate investment trusts; property and economic development; provision of affordable housing; real estate legislation and policy discourse; proptech or real estate technology; and other areas relevant to the built environment. Further details can be found in the journal website at: <https://journals.uct.ac.za/index.php/JARER/index>.

JARER, in the recent past, has been strengthened and continues to grow in leaps and bounds and our efforts at ensuring that JARER acquires international coverage and recognition are paying off. JARER has now been listed in the Directory of Open Access Journal (DOAJ) from January 2023. This is in addition to being recognised as meeting acceptable quality and listed in the 2021 American Real Estate Society's (ARES) Real Estate Journal List. JARER is listed in the three categories (real estate finance, real estate & urban economics and built environment) of the list. The list can be found at: <https://www.aresnet.org/page/journal-list>. A further effort, in this direction, is to get JARER listed in the SCOPUS database and transfer the publication to a reputable publisher in the near future.

We use this opportunity to appreciate the support of the journal editorial board members, our anonymous reviewers, and other stakeholders, including the African Real Estate Society's board members. The support from Prof. Karl-Werner Schulte and his team from the IREBS at Regensburg University, the IRES, and ERES are appreciated. Also, the support of Professor Francois Viruly from the Urban Real Estate Research Unit at University of Cape Town. We cannot forget to appreciate the team and colleagues at the library services at the University of Cape Town, and the Journal Manager, Ms Lesedi Kgaka for their efforts at moving the journal to an enviable height.

Lastly, we rejoice with the President, the entire board members, and every member of AfRES in all the Chapters and particularly the organising committee chaired by Mr. Nicky Nzioki, on the successful hosting of hosting of the 2023 AfRES Conference in Nairobi. Congratulations from all of us at JARER.

Prof. Abel Olaleye

Editor-in-Chief, Journal African Real Estate Research



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Estate Intel is an African real estate market intelligence platform. We provide superior intelligence using Africa's largest database of historic property prices, vacancy rates, and project team data to help businesses beat the competition.

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A F R E S
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Estate Intel Partners with the Africa Real Estate Society (AfRES) to Facilitate Data-Driven Real Estate Research

15th September, Lagos: Estate Intel (EI), Africa’s foremost real estate data bank has signed a Memorandum of Understanding (MoU) with the Africa Real Estate Society (AfRES).

According to the MoU, signed on 28th August 2023, the partnership will entail the provision of data grants to a maximum of four (4) AfRES members by Estate Intel annually, while promoting AfRES’ profile and work across ei channels. The Data grant will be offered together with a 15% discounted membership subscription for AfRES members.

Dolapo Omidire, Founder and CEO of Estate Intel expressed his optimism about the potential impact of the partnership stating “At Estate Intel, it has always been our goal to create more transparency in the African real estate market through the utilization of data. So, the opportunity to partner with AfRES in the provision of data for much needed research and impactful reports is one that aligned closely with our goal, and we are happy to facilitate.”

On the other hand, AfRES will signpost Estate Intel as its official data partner, while leveraging the partnership to increase the use of the EI platform through publications, events/conferences, and social media.

This partnership is borne out of the drive to promote research focused on the African real estate market, thus reducing the market’s opacity which is a key driver for investments. In addition, the partnership will boost the reach of AfRES’ reports and Estate Intel’s profile as the preferred source for real estate data in Africa.

-ENDS

For further information or clarification about the partnership, please email team@estateintel.com.

Notes to Editors

Estate Intel is the leading independent provider of pan - African real estate research and data that help organizations interacting with the real estate and construction industry make faster and smarter decisions. Headquartered in Lagos, the company advises clients across the continent ranging from individual owners and buyers to major developers, investors and corporate tenants.

Africa Real Estate Society is a non-profit organization headquartered in South Africa, and committed to promoting networking, research, and education among property professionals across the African continent.

For further information about the Companies, please visit estateintel.com



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