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Editorial for JARER Vol. 8 Issue 2, 2023

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Editorial

The current issue (Vol 8, Issue 2, Dec. 2023) of the Journal of African Real Estate Research (JARER) contains stimulating and informative articles and, as usual, provides the opportunity for readers to have a deeper understanding of the different types of applied research being conducted in the real estate sector and the built environment in Africa.

In the first paper, the reader is presented with an examination of the predictors of learning apathy amongst Generation Z students of estate management departments in Nigerian public universities. A descriptive research design was employed on 244 Generation Z students. Adapting the Theory of Planned Behaviour and using the Ordered Logit model, the findings report the state of collaborative and simulated learning as significant predictors of student apathy. The paper delineated pathways for policy reengineering towards reducing apathy and improving satisfaction in universities.

The second paper examined the factors contributing to vacancy and unutilised state-owned properties under the custodianship of the Department of Public Works and Infrastructure (DPWI). Questionnaires were administered to 105 DPWI employees responsible for managing vacant properties. The findings showed that external factors, such as poor public sector planning and policy, among others, were the most significant factors influencing vacancy in State-owned properties. Other challenges were related to regulatory framework and policy as well as internal issues indicating weak procurement. The paper concluded on the need for strategies to address the highlighted problems.

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The examination of how condominium housing is governed and the potential inefficiencies with self-governing in Tanzania formed the focus of the third paper. Reflecting on Ostrom's (1990) common pool resources principles, the paper highlighted patterns of interaction and established whether commonly held views about self-governance were borne out in practice. Using a survey approach, the paper's findings showed that the underlying forces that preclude functional and sustainable self-governing communities were unsatisfactory participation and weak enforcement of house rules. The paper concluded on the need for the implementation of plausible dispute resolution mechanisms; in addition to understanding the behaviour of individuals within a space for interaction for self-governing institutions to function successfully.

The fourth paper developed cubic regression models to resolve the accuracy and consistency problems in the valuation of plants and equipment. The study used one industrial sector (the basic metal, iron and steel and fabricated metal product sector), in the two industrial cities of the western industrial zone of Nigeria (Sango Ota and Agbara) as a case study. Data were analysed using means, standard deviations, multiple linear regressions and cubic regressions. Cubic regression analyses showed that the pattern of the movement of transitions of expenditure on repairs over the useful life of plant and equipment was not linear but cubic, and generally followed S-shaped patterns. Multiple regression analyses showed that the S-shaped patterns were in turn influenced by operational factors (such as intensity of use and power outages). The study concluded, among others, that accuracy in physical deterioration modelling follows an S-shaped transition over time.

The fifth paper explored the nature of research contributions to the African Real Estate Society (AfRES) conferences and established the emerging trends across African real estate markets. The study employed a desktop review of 500 abstracts published in the AfRES Conference proceedings from 2011-2022. Descriptive content analysis of the study found top research themes, including Housing/Markets Analysis (19.32%), Finance/Investment (17.69%), Appraisal/Valuation (15.75%), Institutions (11.04%), and Policy issues (10.39%). The country-focused contributions showed the predominance of Nigeria, Ghana, and South Africa. The results also found a significant preference for quantitative (43.20%) and qualitative (26.80%) analyses by authors and that the practice of rotating the location of the annual conferences across regions was valuable for attracting diverse contributions across regional markets, while also fostering inclusivity.

We want to use this medium to appreciate the efforts and support of the journal editorial board members, our anonymous reviewers and other stakeholders, without which the growth witnessed by JARER cannot be possible. Also, the support we continue to receive from the board members of the African Real Estate Society, the Library services at the University of Cape Town and the Urban Real Estate Research Unit at the university is highly appreciated. Our gratitude also goes to the former Journal Manager, Ms. Lesedi Kgaka and the current Manager, Ms. Dayni Sanderson for their diligent efforts to ensure the publication of this issue. We will continue to appreciate the support from Prof. Karl-Werner Schulte and his team from the IREBS at Regensburg University, the IRES, and the ERES.

We look forward to receiving your feedback on this and previous issues of the journal.
Happy Reading!

Professor Abel Olaleye
Editor-in-Chief

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Predictors of Student Apathy Amongst Generation Z Estate Management Students in South-East Nigeria

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Abstract

While extant evidence suggests that Generation Z students are the dominant demography in universities, drivers of their apathetic behaviour toward traditional pedagogic offerings appear minimally researched. The criticality of this lacuna lies in empirical evidence citing linear relationships between apathy and reduced performance. This study ascertains the predictors of learning apathy amongst Generation Z students using Estate Management departments in Southeast Nigerian public universities as a case study. A descriptive research design was employed on 244 Generation Z students of Estate Management departments. Adapting the Theory of Planned Behaviour to allow for generation Z-preferred learning preferences, the Ordered Logit model was used to examine student apathy predictors in public universities. The logits report demonstrated the state of collaborative and simulated learning as significant predictors of student apathy. The findings delineated pathways for policy reengineering towards reduced apathy and improved satisfaction in universities. This is one of few studies at the fore of identifying learning apathy of Generation Z students of estate management departments in public tertiary institutions.

Keywords: *Generation Z, learning preferences, public universities, student apathy, predictors*

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1. Introduction

Existing empiricisms have generated considerable delineations of apathy behaviour in corporate, civil service, manufacturing, tertiary education, healthcare and other establishments (Abd & Behadili, 2019; Glerum & Joseph, 2017; Le Heron et al., 2018; Schmidt et al., 2017; Starkstein & Leentjens, 2008). While there appears to be some sort of prevalence from the healthcare literature, non-healthcare avowals of the topic view it as a state of indifference or impassive behaviour an employee exhibits towards certain work characteristics. However, reviewing this literature also showed some skewness towards employee and consumer behaviour with an incommensurate particularity towards student demography.

The necessity of education for the development, growth and transformation of the global economy has led to the need for more empirical devotion to student apathy. While technological-enhanced learning holds promise, many African universities still lack adequate infrastructure and faculty training to fully adopt blended or online models (Saliba, 2023). Consequently, traditional learning modes remain prevalent at many universities across Africa where learning relies heavily on hardcopy textbooks and written notes with little incorporation of digital resources (Kanwar et al., 2018; Maphalala & Ajani, 2023).

Furthermore, the demographic landscape of African universities has undergone significant changes in recent years with the emergence of Generation Z (Gen Z) as the dominant student population (Bevan-Dye, 2016; Mendoza, 2018). Gen Z, typically defined as individuals born between the mid-1990s and early 2010s, bring with them unique characteristics and perspectives that have distinct implications for higher education institutions in Africa (Gitau, 2019; Saxena & Mishra, 2021). For instance, having grown up with abundant access to technology, Sadouni (2023) argued that Gen Z has shorter attention spans and prefers visual, multi-modal content over static lectures. Thus, the inadequacy of digital integration and opportunities for participatory learning in traditional formats diminishes motivation and engagement for Gen Z students.

Consistently, the growing scale of Generation Z demography within the tertiary education community has overstretched predominant traditional methods in the developing world and has ushered in a critical need for a reengineering process. In agreement, Sun et al. (2021) and Szymkowiak et al. (2021) averred that teaching and management of Generation Zs demand methods that differ from those experienced by other age groups. Putting it into perspective, the inimitability of Generation Z about their predecessors infers that educators need new-age pedagogical interventions to cater to this group of learners (Saxena & Mishra, 2021; Zorn, 2017).

The implication is that where other generations read hardcopy books, generation Zs prefer softcopy (Nissi et al., 2020). While others submitted continuous assessments physically to educators, generation Zs prefer uploading theirs to a portal (Luttrell & McGrath, 2021). Whilst others experienced fieldwork as a means of complementing classroom activities, they prefer simulated and gamified learning (Obi-Aso, 2020; Saxena et al., 2021; Zain et al., 2021).; Even when others were examined individually during tests, generation Zs prefer collaborative presentations (Martin et al., 2019; Zorn, 2017). Finally, while others had physical interactions with their lecturers, generation Zs prefer the use of interactive

applications such as e-messaging applications like WhatsApp, email and social media to engage their lecturers.

The corollary of the foregoing is that Gen Z students tend to have apathy towards traditional pedagogic offerings. In agreement, studies from Cheon and Reeve (2015), De Lay and Swan (2014), Denton (2005), Gillet et al, (2012) and Schlotfeldt (2018) asserted that student apathy is becoming a phenomenon and inadequate empirical attention in this regard is worrying. Interestingly, Mendoza (2018) and Stout (2023) confirm the existence of apathetic behaviour amongst Generation Z students. Accordingly, this reinforces the need for more empirical attention on this anomaly. Therefore, these preferences cannot be ignored in tertiary education planning, especially in consideration of the criticality of apathetic behaviour to learning performance and sustainability. This position is buttressed by Benders (2011: 2) who argued that "student apathy has risen to a level that places education in the United States at serious risks… and on a downward spiral". Thus, it must be identified and addressed to overcome the shortcomings it poses to education sustainability (Benders, 2011; Nissi et al., 2020; Szymkowiak et al., 2021; Zorn, 2017).

A comparison of the low literacy rate in Sub-Saharan Africa with other regions in the world (World Bank, 2022) suggests the issue is more critical to the Sub-Saharan region. Despite this urgency, the literature examined indicated there is a form of research inadequacy on student apathy about the region. The connection between student apathy as a significant source of low literacy rates globally (Benders, 2011; Bosserman, 2018; De Lay et al., 2014; Obi-Aso, 2020; Shlotfeldt, 2018), shows that investigating the determinants of this behaviour appeals to changing the narrative on it. Following this key recommendation, the study analyses Generation Z in line with the arguments on their sizeable student population that influence changes in the tertiary education sector (Balakrishnan, 2017; Findik et al., 2017; Lodesso et al., 2018; Obi-Aso, 2020; Wild & Heuling, 2020). Generation Z refers to persons born from 1997 onwards (Dimock, 2019; Schwieger a Ladwig, 2018) coinciding with the pervasiness of the Internet-of-Things like social media (Dhinakaran et al., 2020; Jaciow & Wolny, 2021). In this regard, certain reflections support the concentration on Generation Z.

Firstly, perceptions and observations on Generation Z characterise them as relatively smarter and more tech-savvy (Ozdemir-Guzel & Bas, 2021; Cilliers, 2017; Dolot, 2018; Hegade & Shettar, 2022; Kahawandala et al., 2020; Oh & Nah, 2019). This perspective aligns with the preference amongst Generation Zs for pedagogy that is gamified, simulated, collaborative and interactive (Cilliers, 2017; Dhinakaran et al., 2020; Hegade et al., 2020; Kuliya & Usman, 2021; Obi-Aso, 2020; Oh et al., 2019). These preferences arguably present novel challenges for the traditional pedagogic delivery that characterises most tertiary institutions in Sub-Saharan Africa (Nissi & Ewurum, 2020; Eze et al., 2018; Maphalala & Adigun, 2021; Moakofhi et al., 2017; Njenga, 2018; Ntshwarang et al., 2021; Yakubu & Dasuki, 2018). Secondly, with the accentuation of pandemic-driven e-learning, lecturers of real estate education in the region are confronted with the challenge of combatting apathy by keeping Gen Z motivated and committed. As such, the study aims to examine the predictors of student apathy for Gen Z in Sub-Saharan Africa, using public tertiary institutions in South East Nigeria as an empirical case.

2. Literature Review

The first aspect of the literature review examines non-healthcare apathy literature and learning preferences desired by the Generation Z population in Sub-Saharan Africa. The

review of apathy literature considers the definitions and determinants of apathetic behaviour. The second thread of the review examines the behavioural characteristics of Generation Z demography, accounting for their learning preferences.

2.1 Apathetic Behaviour

Apathy-related literature is dominated by healthcare and clinical expositions of the concept. From this perspective, apathy refers to a generic neurocognitive psychiatric syndrome in the elderly causing reduced or absent stimulus responsiveness and self-initiated action (Ishii et al., 2009; Murphy, 2000; Massimo et al., 2018). The use of 'elderly' and 'clinical-related terms' in these apathy definitions excludes them from the context of this paper. On the other hand, apathy has been used to reflect the cognitive conditions of a variety of individuals and groups across employee, consumer, voter, stakeholder, public, and student spheres pertaining to dissatisfaction, withdrawal and absenteeism from particular subjects and environments.

Leadership and management scholars view apathetic behaviour largely from an employee's lack of motivation due to feeling underappreciated (Abd et al., 2019; Chen & Li, 2019; Hansen & Levin, 2016; Schmidt et al., 2017), or an indifference towards the mission and vision of the organisation (Glerum et al., 2017; Hollis, 2019; Kinyua, 2019). Work on apathy has also considered it from the perspective of non-organisational characterisations such as group (for example, voters, stakeholders and unions) and public apathy. The latter refers to indifference caused by a lack of interest in something (Antadze, 2018; Dahl et al., 2018; Lutfiu, 2018). The inspection of both perspectives indicated a uniform conceptualisation of the concept.

Of importance to this study was the marketing literature. It regards apathy through the perspective of the consumer or customer and defines it as a lack of excitement over the product or service delivered, or a lack of motivation towards purchase (Buchanan, 2017; Elhajjar, 2018; Lee & Kim, 2018; Sung et al., 2021). This is in agreement with expositions on student apathy as a display of indifference to learning. Marshall (2012) presented a source of reference with a study that acknowledged student apathy as a state of indifference or disengagement from the classroom. Furthermore, it opened up an understanding of the state of mental absenteeism shown by students as a result of inconsistent and unsatisfactory cognitions experienced within the learning environment. Other studies reported a lack of motivation, interest and enthusiasm that leads to low attendance, absenteeism, refusal to learn, ignorance of sanctions, lack of class participation, delayed or non-responsiveness to assessments, and limited involvement in student activities ((Benders, 2011; De Lay et al., 2014; Panda, 2021).

The aforementioned results are determined, for example, by family, peer influence, finances, and the working environment; with the latter being a crucial focus in research into student apathy. Moreover, the working environment in this research considers the learning environment as an essential determinant of apathetic behaviour. Evidence from these studies conveys the culpabilities of perceived mediocre teaching, obsolete assessment methods, and the absence of learning processes (Benders, 2011; De Lay et al., 2014; Marshall, 2012; Nissi et al., 2020; Obi-Aso, 2020; Panda, 2021). Given the focus on public tertiary education institutions, these studies substantiate the examination of apathetic behaviour displayed by Generation Z estate management students in South-East Nigeria.

2.2 Generation Z

Prior to the Generation Z demography, there have been other core generations – generation X, millennials, baby boomers and the silent generation (traditionalists) – who encompass distinct cognitive characteristics and preferences. Generation Z are known in this period as digital natives because of their relatively enhanced access to digitised devices at a young age. Their proximity to technology has developed a level of tech-savviness that has distinguished them from other age groups. Moreover, it has aided the nurturing of a self-help attitude that makes them confident and convinced of their principles, in addition to the cultivation of an analytical mind. With the swiftness of technological applications, generation Z tend to be agile and unconventional thinkers; while on the undesirable side, they also tend to be impatient (Ömür, 2021; Szymkowiak et al., 2021).

The social interests of Gen Z comprise social media, social entrepreneurship, pop culture, and social networking (Goldring & Azab, 2021; Haddouche & Salomone, 2018). These interests describe their affinity to digitised processes (Jacobsen & Barnes, 2020; Sun, 2021). As a result, educating them has been deemed a significant challenge for the predominantly traditionally and analogically-rooted stream of educators who lack the digitised privileges afforded to Generation Zs (Nissi et al., 2020; Njenga, 2018; Ntshwarang et al., 2021; Yakubu & Dasuki, 2018). Lending credence, and perhaps more perturbing, is evidence from sub- Saharan African literature supporting the assertion that Generation Z students possess superior knowledge, insight, and competence in digitised processes than their educators and parents (Eze et al., 2018; Maphalala & Adigun, 2021; Moakofhi et al., 2017; Nissi et al., 2020; Obi-Aso, 2020). Therefore, it can be argued that their ideal school habitat is a contemporary and interactive learning environment.

2.3 Learning Preferences of Gen Z Students

So far, it has been established that Generation Z students have learning preferences that are atypical to traditional pedagogic modes. Briggerman (2021) and Martindale et al. (2023) emphasise the implication of this assertion with the argument that where traditional modes are prevalent, apathetic behaviour is expected. Validating this contention, Jaiyeoba and Iloanya (2019 explored the relationship between various metrics of the Technology Acceptance Model, such as perceived ease of use, perceived usefulness and perceived web privacy of e-learning resources, on the attitude and behavioural intentions of university students towards virtual learning platforms.

To conduct the study, a quantitative approach was employed utilising self-administered survey instruments. The participants were university students with a minimum of one year of e-learning experience. The survey instruments underwent psychometric evaluation, ensuring that the metrics of perceived ease of use, perceived usefulness, extent of e-learning use, perceived web-based privacy, attitude and behavioural intentions met the established thresholds of reliability and validity as outlined in existing literature. Correlation and regression analyses were then conducted to examine the hypothesised relationships. The findings revealed that e-learning use, perceived usefulness, and attitude were positively associated with learners' behavioural intentions in Botswana. Furthermore, the regression analysis indicated that the extent of e-learning use, perceived usefulness, perceived ease of use, and attitude significantly impact behavioural intentions.

Following this perspective, there is a need to identify the learning preferences of Gen Z students as a means of analysing the apathy determinants that arise from its inadequacy in the

pedagogic offerings of tertiary education institutions in the study area. Collaborative learning has been shown to be highly effective for Gen Z students. Studies have emphasised their preferences for group activities, interaction, knowledge sharing and social learning (Düzenli, 2021; Szymkowiak et al., 2021). Those who support this form of learning posit that collaborative learning enhances mentorship programmes which pair younger students with older role models to foster guidance and leadership development (Klinge, 2015; Zachary & Fain, 2022).

On the other hand, researchers have approached the Gen Z learning preferences discussion from a simulated learning techniques aspect. Bobek and Tversky (2016) opine the use of diagrams, graphs and other visual representations strengthens abstract concept formation. Acchiardo et al. (2015) posit that when these are used to incorporate real examples and case studies into lectures, Gen Z students appreciate learning more because simulation brings course concepts to life and cultivates long-term retention for them. Bogner (2016) emphasises that Gen Z students appreciate learning management systems like Google Classroom because they facilitate resource sharing and streamline assignment collection/grading for them. Karis et al. (2016) agreed the use of video conferencing tools allows for remote participation and synchronous collaboration amongst this demography. Nicholas (2020) confirms that the ubiquitous use of freely available eBooks and apps that deliver course content flexibly on a variety of personal devices has been found to boost Gen Z student motivation, performance and satisfaction.

The foregoing suggests that lecturers who actively engage students through simulated learning, team-based approaches, polls, chats and feedback see improved attendance and participation amongst Gen Z students. This also confirms Bruggeman's (2021) and Martindale et al. (2023) arguments that inadequacy of collaborative learning essentials such as group reading, group discussion, mentorship, team approach; simulated learning techniques resembling automated continuous assessment, diagrammatic representations, graphical illustrations, projectors and laptops in teaching, use of real-life events for class discussion; and digital interactivity tools in the form of e-classroom tools like Google Classroom, and e-lecture applications such as Zoom, Microsoft Meet, and Google Teams. In this digitalised learning system feedback is encouraged by lecturers. Yet, the use of learning applications such as eBooks may result in learning apathy for Gen Z students.

3. Theoretical Foundation and Empirical Review

The theoretical premise of the study is anchored on Ajzen's (1985) Theory of Planned Behavior (Figure I), which is derived from social psychology. The theory, which is also an extension of Fishbein and Ajzen's (1975) Theory of Reasoned Action, positions an individual's behaviour as the outcome of their intention to perform the behaviour, and this intention is determined by their perception. Concisely, the theory argues that behaviour such as apathy is a result of beliefs and perceptions. Within the context of the study, the theory suggests that student apathetic behaviour arises as a result of their perceptions of the learning methods adopted by their universities.

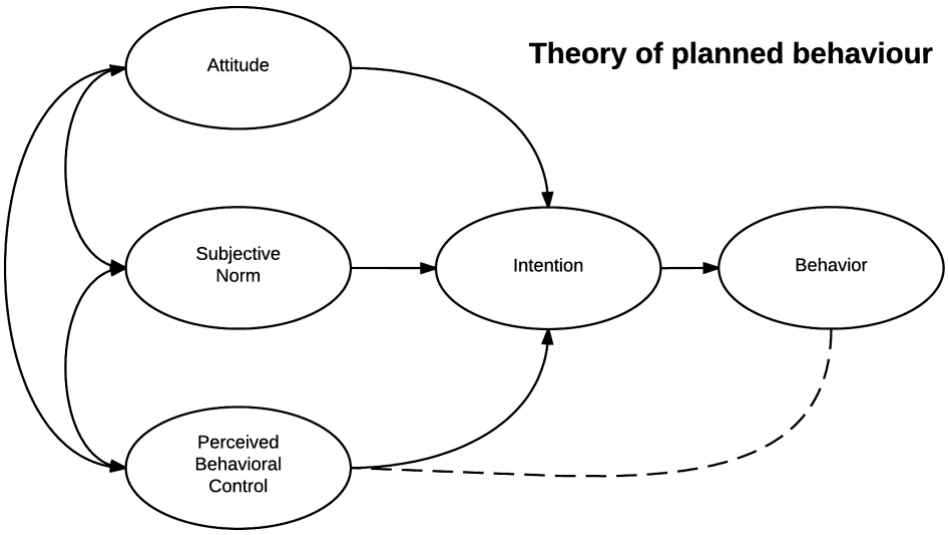

Figure 1.
Source: Ajzen (1985)

Figure I encapsulate the Theory of Planned Behaviour as a proposition that behaviour arises from intention to performance of behaviour, and such intention in itself being a product of attitude, subjective norm and perceived behavioural control. Based on this, apathetic behaviour is assumed to be a result of the attitude created by a student's perception of the pedagogic delivery method adopted by their school. The studies highlighted have approached this issue from diverse perspectives. In addition to Jaiyeoba et al. (2019) propositions of the Theory of Planned Behaviour, Corona and Ibáñez (2015) aimed to understand the perspectives of 250 Mexican students on the effectiveness of cooperative learning in chemistry. The study utilised an exploratory-descriptive methodology, including a pre-test and a post-test. By implementing cooperative learning, the researchers evaluated the significance of positive interdependence in fostering critical thinking skills. Additionally, the study revealed a shift away from focusing solely on theoretical content towards integrating everyday contexts that are meaningful to students.

Sambuaga (2020) examined the differences in student learning outcomes in Mathematics when taught using cooperative learning models compared to conventional methods. Using experimental research on 72 randomly selected students from the eleventh grade of SMA Negeri I Airmadidi, North Minahasa Regency and ANOVA as a data analysis tool, the study found differences in mathematics learning outcomes between students with high learning interest taught using the TPS cooperative learning model, and those taught using the conventional learning model.

Niknaee et al. (2022) investigated students' satisfaction with virtual education during the COVID-19 pandemic. Using a systematic review of Persian and English articles extracted from Persian (SID, Magiran, and CIVILICA); and English (PubMed, Scopus, Web of Science, and EMBASE) databases, the study found that students' satisfaction with virtual education during the COVID-19 pandemic across worldwide studies aggregated about 82%. The highest satisfaction was observed in Saudi Arabia, Poland and South Korea; and the lowest satisfaction was related to students from Jordan, Iran and the USA. In contrast, Al- Qirim (2011) assessed the determinants of interactive whiteboard technology (IWBT) success in teaching in higher education institutions in the United Arab Emirates. Setting up the study

to validate extant relevant theories like the Theory of Planned Behaviour, the study revealed the challenges that impede the full integration of IWBT in tertiary education teaching. It also shared the recommendations to further enhance the use of IWBT in teaching. From the review of selected extant literature, inquiries directly exploring the perspectives and lived experiences of affected students are scarce. This scarcity limits insights into the personal and contextual factors influencing their academic motivation. Comparatively, few studies have examined potential disparities in apathy prevalence and drivers across different demographic profiles within this population. With Gen Z exhibiting distinct attributes as digital natives, more contemporary research is warranted. Particularly, an evaluation of Gen Z's subjective norms to institutional pedagogies specifically designed for the South East Nigerian university environment is limited and largely unexplored. The study could offer insights that may better inform the design of targeted strategies to optimise learning experiences and outcomes for Gen Z in this context. Following these arguments, we analyse how the lack of these digital and collaborative integrations predicted the apathetic behaviour of Generation Z students in the study area. By so doing, the study is a validation of the propositions of this theory within the context of tertiary education pedagogy in South East Nigeria. A scale measurement of apathetic perceptions would be employed using a Likert scale consistent with Hansen and Levin (2016) and Utz et al. (2021).

4. Materials and Methods

4.1 Design and Sampling

This latitudinal cross-sectional study employed descriptive research design in a questionnaire survey of students in selected South East Nigerian public tertiary institutions. Simple random sampling was employed to reach a sample frame of 244 students in the Department of Estate Management of the University of Nigeria Nsukka, Nnamdi Azikiwe University Awka, Chukwuemeka Odimegwu Ojukwu University Igbariam, and Institute of Management and Technology Enugu, Nigeria.

The sample frame was determined by applying the Freund and Williams formula for the infinite population because there were no records on the number of Generation Z students in the departments. The unit of analysis was pedagogic delivery methods and systems employed in the teaching of Estate Management and Built Environment courses in public universities. Thus, through elimination criteria, responses outside the content scope of the study and those emanating from non-generation Z students were not considered for analysis.

4.2. Research Model

Considering the theoretical framework of the study, the research model is an adaptation of the Theory of Planned Behaviour (Ajzen, 1985) and an extension of Hegade et al. (2020), Nissi et al. (2020) and Obi-Aso's (2020) understanding of Generation Z preferences. Thus, the study hypothesises that perceptions of collaborative, interactive and simulated learning methods adopted by the tertiary institutions under study will predict intentions for apathy within this student group. This adaptation is illustrated in Figure 2.

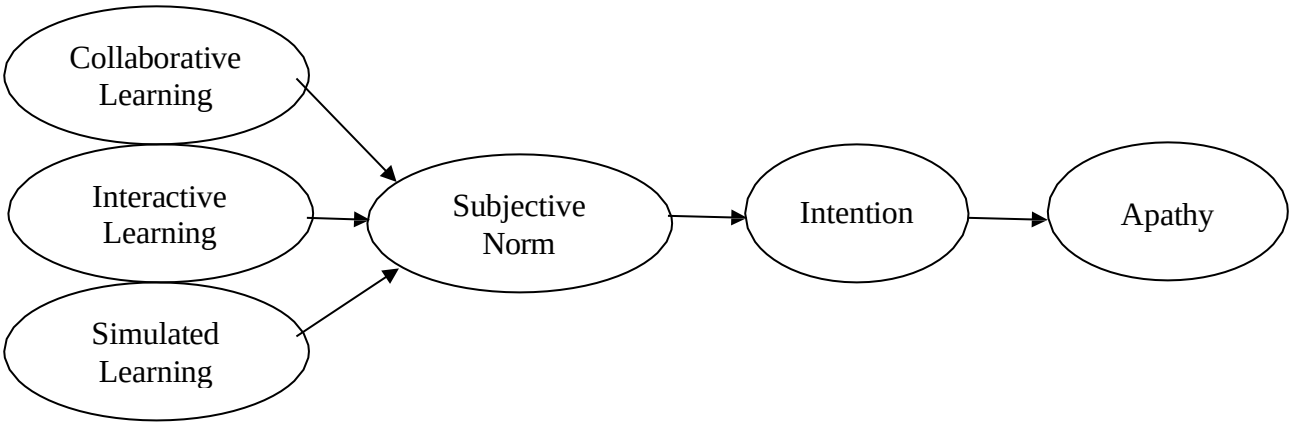

Figure 2: Research Model

Figure 2 illustrates the research model comprising the collaborative, interactive and simulated proxies of the pedagogic variable and their pathways to student apathy. The model shows students' subjective norms and responses to collaborative learning –a representation of the preference for group learning and tasks; interactive learning – which refers to the use of automated interactive solutions such as computer applications and web-based communication media; and simulated learning – describing the use of computer models (particularly graphical) to represent a real-life scenario.

Ajzen (1985) avers that subjective norm refers to the perceived social pressure to perform or dismiss a particular behaviour. The study appraised how these subjective norms predicted apathy intentions amongst the respondents. The study draws on Ramadania and Braridwan (2019) and Suk et al. (2021) research that conceptualised subjective norms as the individual's normative perception of an important referent, and how they want to conform to that referent. The study assessed subjective norms through Likert scale questions regarding collaborative, interactive and simulated learning experiences. Using their specific proxies, such as group learning, web-based communication media, and computer modelling of real-life scenarios, identified in the literature review allows the study to quantify respondents' subjective norms and their relation to apathy.

5. Development and Validation of Research Instrument

The subjective norm-intention-apathy behaviour link in the research model was developed using a Likert-scale structured electronic questionnaire. The variable constructs in the questionnaire comprised collaborative learning, interactive, and simulated learning as obtained from Hegade et al. (2022), Nissi et al. (2020) and Obi-Aso (2020), and the outcome was the establishment of a Generation Z Learning Apathy Scale. The scale went around the satisfaction variate to underscore the link between student experience and apathy. The argument is premised on the logic that where the student is satisfied with the pedagogic experience, chances of apathy would be low, and *vice versa* (Harrebye & Ejrnæs, 2015; Pinkleton et al., 2012; Posner, 1999; Robert-Okah, 2014). Consequently, the scale had a 5- point measurement parameter where scale 1 is indicative of low satisfaction with the pedagogic experience, and scale 5 exhibits high satisfaction. By construal, low satisfaction

implies high apathy, while high satisfaction is construed to mean low apathy for the variable constructs.

The Generation Z Learning Apathy Scale was validated for reliability through a pilot survey of 45 participants. The results were analysed with Cronbach alpha and a coefficient of .988 was determined. Face validity was employed to verify the adequacy of the instrument to the research problem.

6. Analysis

After the identification and exclusion of irrational responses, the sample size used by the study was 217 (after excluding 27) Generation Z students in the estate management department of public tertiary institutions in South East Nigeria. To understand the underlying pedagogic attributes driving student apathy, we estimated an ordered logit model (Equation II) on SPSS, with apathy as the dependent variable to ascertain specific group learning aspects that Generation Z estate management students were most apathetic about. Ordered logit models demonstrate an ordinal dependent variable response to a number of continuous explanatory variables (Breen et al., 2018; Grilli & Rampichini, 2014). Accordingly, ordinal logistic regression analysis was used to ascertain the predictors of student apathy for tertiary institution pedagogic delivery. After adjusting for multiple variables, the parameter estimates, level of significance and confidence intervals were presented.

$$\text{Logit}(P/1-P) = a + b1*C_L + b2*S_L + b3*I_L \qquad \text{Equation (II)}$$

6.1 Decision Rule

The result is statistically significant where *p*-value <.05 at 95% confidence interval.
Interpretation: This implies that the student is satisfied with the pedagogic constructs available. However, where *p*-value >.05, it implies that the null hypothesis would not be rejected. This indicates low satisfaction, and therefore high apathy (Harrebye & Ejrnæs, 2015; Pinkleton et al., 2012; Posner, 1999; Robert-Okah, 2014).

7. Results

The following results show the ordinal logistic regression coefficients (β) of the relationship between pedagogic value chain constructs and student apathy in South East Nigeria. Logits for satisfaction with the extent of integrating collaborative learning, simulated learning, and interactive learning in the pedagogic value chain of public tertiary institutions in the country were presented respectively in Tables IV, V and VI.

Table 1: Ordinal Regression Analysis of the Relationship between State of Collaborative Learning and Student Apathy

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Rating = 1.00]	-3.012	.338	79.490	1	.000	-3.674	-2.350

	[Rating = 2.00]	-1.133	.231	24.175	1	.000	-1.585	-.682
	[Rating = 3.00]	.660	.224	8.694	1	.003	.221	1.098
	[Rating = 4.00]	2.107	.253	69.283	1	.000	1.611	2.603
Location	[Factor=Group disc]	.577	.305	3.576	1	.059	-.021	1.174
	[Factor=Group read]	.164	.304	.292	1	.589	-.432	.761
	[Factor=Mentorship]	.147	.304	.233	1	.629	-.449	.743
	[Factor=Team App]	.422	.318	1.762	1	.184	-.201	1.044
	[Factor=WB disc]	0[a]	.	.	0	.	.	.

Link function: Logit

a. This parameter is set to zero because it is redundant

Table 1 shows the ordinal logistic regression analysis of pedagogic construct – collaborative learning and how its adoption by the schools leads to student apathy. In South East Nigeria, the state of group reading, group discussion, mentorship and team approach to problem- solving all recorded *p*-values >.05 on the satisfaction scale implying that Gen Z estate management students were not satisfied with their offerings. Therefore, the state of group reading (β = .577), group discussion (β = .164), mentorship (β = .147) and team approach (β = .422) all contributed to student apathy in South East Nigerian universities. The most significant predictor of student apathy arising from collaborative learning experience was dissatisfaction with the frequency of group discussion and mentorship, due to their lower regression coefficients (β = .164 for group learning; β = .147 for mentorship).

Table 2: Ordinal Regression Analysis of the Relationship between State of Simulated Learning and Student Apathy

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Rating = 1.00]	-2.129	.262	66.040	1	.000	-2.642	-1.615
	[Rating = 2.00]	-.481	.233	4.255	1	.039	-.939	-.024
	[Rating = 3.00]	.946	.237	15.867	1	.000	.480	1.411
	[Rating = 4.00]	2.325	.272	72.937	1	.000	1.791	2.859
Location	[Factor=Auto CA]	.041	.311	.018	1	.895	-.568	.651
	[Factor=Computer]	-1.029	.316	10.609	1	.001	-1.649	-.410
	[Factor=Diagram]	-.128	.311	.170	1	.680	-.738	.481
	[Factor=Graphics]	.015	.311	.002	1	.962	-.594	.624
	[Factor=Life event]	.616	.312	3.900	1	.048	.005	1.228
	[Factor=Life-like]	0[a]	.	.	0	.	.	.

Link function: Logit

a. This parameter is set to zero because it is redundant

Table 2 illustrates the model analysing the contributors of student apathy from the perspective of the simulated learning experience. Generation Z estate management students were dissatisfied with the following constructs: automated continuous assessment (β = .041; *p*=.895), diagrammatic representations (β = -.128; *p*=.680) and graphical illustrations (β = .015; *p*=.962), leading to apathetic behaviour. However, they appeared satisfied with the integration of computer systems such as projectors and laptops in teaching (β = -1.029; *p*=.001), and the use of real-life events for class discussion examples (β = .616; *p*=.048). As a result, these did not lead to apathetic behaviour. From the perspective of simulated learning integration in teaching, the most significant predictor of student apathy was the insufficient adoption of automated continuous assessment.

Table 3: Ordinal Regression Analysis of Relationship between State of Interactive Learning and Student Apathy

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Rating = 1.00]	-3.087	.279	122.033	1	.000	-3.635	-2.540
	[Rating = 2.00]	-1.435	.236	36.829	1	.000	-1.898	-.971
	[Rating = 3.00]	-.047	.220	.045	1	.832	-.477	.384
	[Rating = 4.00]	1.970	.267	54.424	1	.000	1.446	2.493
Location	[Factor=eClass]	-1.332	.309	18.618	1	.000	-1.937	-.727
	[Factor=eLecture]	-2.253	.323	48.672	1	.000	-2.886	-1.620
	[Factor=Feedback]	-1.065	.306	12.108	1	.001	-1.665	-.465
	[Factor=LearnApp]	.719	.308	5.427	1	.020	.114	1.323
	[Factor=PtoP]	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Table 3 highlights the logits for apathetic behaviour arising from dissatisfaction with the perceived digital interactivity of pedagogic offerings. Generation Z students of estate management were satisfied with all the constructs for interactive learning: use of e-classroom tools such as Google Classroom (β = -1.332; *p*=.000), e-lecture applications such as Zoom, Microsoft Meet, and Google Teams (β = -2.253; *p*=.000), feedbacks are encouraged by lecturers (β = -1.065; *p*=.001), and use of learning applications such as eBooks (β = .719; *p*=.020). This is informed by their p-values (*p*<.05), while the parameter estimate for the use of learning apps shows that it is the most significant integration of interactive learning. In essence, the result confirms that Generation Z students in the study area are not apathetic towards the adequacy of interactive learning experienced.

8. Conclusion

The study aimed to identify predictors of apathy amongst Generation Z students in South Eastern Nigerian universities based on their perceptions of teaching methods. An adapted Theory of Planned Behaviour model was used to develop an apathy measurement scale incorporating collaborative, simulated and interactive learning. Ordered logistic regression found dissatisfaction with the adequacy of collaborative and simulated learning experiences, thus making them significant predictors of learning apathy amongst the students. In this context, key implications include the identification of priority areas for pedagogical policy reform to improve group discussions and teamwork under collaborative learning and adopting automated assessments for simulated learning. This study recommends enhancing these aspects to boost performance, ensuring legitimate grading to build trust, and facilitating digital access to materials across tertiary education institutions in South East Nigeria.

Furthermore, the limitations shown focused on geographical and institutional scope. Future research could employ mixed methods and expand the survey to other regions/institutions, while also examining lecturer apathy factors. In addressing these gaps a more robust understanding of the issues to better support all stakeholders in enhancing the learning experience of this prevalent undergraduate student group.

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Blighted Properties: Factors Contributing to Vacancy and Underutilised State-Owned Properties in South Africa

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Abstract

A blighted property is a property that has deteriorated, is vacant, has been abandoned, or has been foreclosed. This happens when a property loses value over time due to neglect or damage. The study examined the factors that lead to vacancy and underutilisation of state-owned properties managed by the Department of Public Works and Infrastructure (DPWI). Most of the Department's properties are over 100 years old. Some of the vacant and underutilised properties are at risk of theft, vandalism, vagrancy, and illegal occupation. Moreover, these properties have not been properly maintained. The cost to the State of maintaining vacant buildings without any return on investment, ongoing municipal payments, and security for safekeeping requires a discussion of strategies to address this issue. A survey was conducted with 105 DPWI employees responsible for managing vacant properties and ensuring their well-being. The relative importance of the contributing factors was measured using the relative importance index method, which identified fourteen factors ranking as high-medium. The study identified external factors such as inadequate public sector planning, economic indicators, historical spatial planning, new development patterns, and weak leadership as the main causes of the vacancy problem. Internal factors included excessive regulation, weak policy framework, poor asset management strategies, and ineffective procurement processes.

Keywords: *blighted properties, vacant buildings, public works and infrastructure, maintenance, life cycle asset management, state-owned properties*

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1. Introduction

The public sector owns a wide range of real assets, including land for infrastructure such as roads, water, sewer, sewage treatment plants, landfills, cemeteries and public investment projects, as well as land for residential and commercial development, schools, apartment complexes and business offices. The public sector in South Africa owns a significant number of these assets, with the Department of Public Works and Infrastructure reporting a total of 82,114 properties in its portfolio as of March 2021. Of these, 80,085 government buildings (about 97.7%) are in use by various government departments, while 2,029 (2.3%) are considered unused and vacant (DPWI, 2021). These physical structures, also known as infrastructure, play a crucial role in supporting and providing services for the community or nation (Cantú, 2017; Snieska & Simkunaite, 2009; Prud'-homme, 2004).

Infrastructure is crucial for development as it can hinder economic growth if not properly managed and maintained (Watermeyer and Phillips, 2020). The lack of maintenance of government properties has led to neglect, vacancy and vandalism which have in turn affected the value of the buildings themselves and the surrounding properties. Local authorities continue to bill for services and hire security to protect these vacant buildings, resulting in an increase in office space rentals by the private sector. Many government buildings are over 100 years old, and the number of vacant buildings is growing – resulting in higher maintenance costs without a return on investment. The failure to maintain and commercialise some of the state buildings has therefore led to missed economic opportunities in many parts of South Africa (Holmes, 2020). Additionally, the lack of proactive asset management strategies in the public sector and the failure to maintain existing buildings accelerates their deterioration process ultimately affecting service delivery (Malawi and David, 2016).The little effort to improve the management of public assets – despite the substantial size of its portfolio of assets – has meant that numerous properties have remained vacant. While previous research by Han (2019), Mallach (2006), and Accordino and Johnson (2000) has shown how private residential properties contribute to the vacancy issue, the reasons for the vacancy of state-owned properties are not well understood. This paper examines the factors contributing to the vacancy and underutilisation of state-owned properties and proposes strategies to improve the management of public assets.

2. Literature Review

2.1 Defining Blighted Properties (Vacant and underutilised properties)

The concept of blight within property development is multifaceted and lacks a universal definition (Jones-Farmer and Heorl, 2019; Wagner, 2018). One of the first pioneers to address blight in urban areas was Philip Darling in 1943 who defined urban blight as abandoned or poorly maintained real estate properties that generally include vegetation overgrowth, trash-filled yards and alleys, graffiti and broken windows.. A 2022 study by Ferreira, Spahr, Sunderman, Govindan, and Meidutė-Kavaliauskienė demonstrates that blighted areas also tend to be characterised by limited living areas, poorly maintained properties with deficient lighting and air quality. These signs, according to Schilling and Pinzón (2016), indicate neglect.

The issue of urban blight remains relevant in contemporary society as indicated by recent research (Barão et al., 2021; Ferreira et al., 2018; Brault et al., 2019). Blight has far-reaching socioeconomic, physical and environmental implications which lead to potential real estate market failures, disinvestment and a decline in property values within affected areas. Scholars

have emphasised that urban blight which contributes to the deterioration of properties has a detrimental knock-on effect on surrounding communities (Huang et al., 2019; Lee et al., 2018; Egbelakin et al., 2017). It must be noted that there is a difference between vacant properties and abandoned properties. According to the Vacant Properties Research Network (2015), vacant properties are those that are not occupied but may still have active owners. Abandoned properties on the other hand usually have no active owners and are uninhabitable, structurally unsafe and/or beyond repair. This paper focuses on vacant properties – rather than abandoned – and analyses properties that are vacant and the effect their depreciation over time could have on future use. It therefore considers vacant state-owned properties as falling under the scope of urban blight.

2.2 The problem of vacant properties

Vacant buildings are a widespread issue that affects both developed and developing countries (Crifasi et al., 2022; Buitelaar et al., 2021; Takamura, 2021; Yakubu et. al 2017). There are opportunities as the global economy evolves for innovation and efficient use of company resources which can lead to the adoption of new asset management strategies. For example, the connection between corporate strategy and corporate real estate strategy (CRES) must take into account global factors and the business environment to optimise real estate use and to support organisational performance. According to Wojewnik-Filipkowska, Rymarzak, and Lausberg (2015), a lack of clear strategy leads to a failure to differentiate between strategic and operational management, resulting in fragmented management activities. Failing to leverage best practices from other areas of public management ultimately renders public sector real estate asset management objectives insufficient.

Assets are typically managed in four phases: planning, acquisition, operation and maintenance, and disposal (Crittenden et al., 2018; Keqa, 2016). Campbell et al. (2015) define asset management as a nine-stage process that includes asset strategy, planning, evaluation, design, acquisition, operation, maintenance, modification and disposal. According to Read (2017), asset management also involves ten interrelated functions which are aimed at improving the financial performance of income properties. These activities include acquisition support, business planning, team management, budget preparation, approval of lease/capital expenditures, promotion of operational efficiency, market research, financial analysis, disposition support and reporting/monitoring. All of these scholarly views emphasise the importance of using effective strategies to manage assets throughout their lifecycle. Changing economic landscapes, new developments and the introduction of new technologies in the built environment sector are contributing to the vacancy of state-owned buildings. According to Masterson, Shackleton, Selomane, Van Staden and Venter (2020), vacant state-owned properties are incurring significant costs for the South African Government due to vandalism and neglect. Grabill et al. (2019) argue that vacant state-owned properties are leading to a decline in neighbouring properties and communities, attracting homeless individuals, vagrants and criminals. This has resulted in the loss of market value and environmental cleanliness in highly respectable neighbourhoods and communities. The authors also note that vacant buildings hurt neighbouring housing while the demolition of vacant buildings can result in urban renewal or development, with neighbouring housing potentially increasing in value. Holmes (2020) contributes to this argument, highlighting the substantial loss of economic opportunities which has resulted from the inability to maintain and commercialise state buildings in various parts of South Africa. They suggest that partnerships with the private sector could address and combat this issue.

In general, however, public, private and state negligence of maintenance is a significant factor in the increase and decrease of costs for property users (Crittendon et. al, 2018). The 2008 global financial crisis resulted in a rise in underinvestment in maintenance, as noted by the McKinsey Global Institute (2016). However, challenges in public sector maintenance have been ongoing for many years and predate the financial crisis. For instance, Mackie et al. (1973) argue that numerous government buildings in South Africa were built during the colonial period (roughly between the 19th and 20th centuries). These structures have deteriorated over time due to exposure to the elements and underscore the importance of regular maintenance.

Johnson (2020) found that some state-owned buildings are being illegally occupied by refugees and homeless individuals who lack the financial means and municipal rights to maintain these properties. As a result, municipalities are unable to manage these vacant buildings which leads to significant economic losses. Vacant, abandoned, and unoccupied properties all contribute to increased crime rates, health hazards, and public safety risks such as collapsing building components and fires (Degli et al., 2022; Atamewan, 2020; Mallach, 2006). For example, a fire in a five-storey building in Johannesburg in September 2023 resulted in the deaths of over 70 people. This building, referred to as a "hijacked building", was illegally rented out by a crime syndicate and lacked basic amenities such as water, sanitation and electricity (Reuters, 2023). Moguerane (2018) has also noted the direct correlation between increased crime rates with the number of vacant and abandoned buildings.
Arguably, past government policies have also contributed to the issue of vacant properties in addition to general structural conditions. For example, subsidies in the United States for the migration of the middle class from central cities after World War II as well as housing policies that favoured new construction over existing development are seen as contributing factors to urban blight in some states (Gelfand, 1975; Bennett, 1990; Myers, 1991). In South Africa, the transition to democracy and government in 1994 resulted in institutional restructurings. This directly resulted in lower incomes for new immigrants, reduced tax and rate payments, and weakened municipal capacity to deliver necessary services. Ultimately, this resulted in urban blight in many city centres such as Hillbrow in Johannesburg – where the white population left their homes and the area became inhabited by low-income immigrants who could not maintain the high standards of the area – and Central Hill in Port Elizabeth – which was left to decay due to the construction of the Settler's Way Freeway in 1963 (Mzamo, 2018; Wasserman, 2014; Morris, 1994).

When it comes to the private sector, lifecycle asset management – which Crittenden et al. (2008) emphasise the importance of – is a practice that government agencies have been slow to adopt due to heavy regulations and procurement practices. The criteria used to evaluate and award public tenders as well as general regulations have contributed to inefficiencies in asset management (Bolton, 2014). However, while the 2017 preferential procurement regulations issued by the South African National Treasury dictated a specific role for the functionality (quality) criteria, the price criteria seem to take precedence – leading instead to poor performance of contractors. Many countries in general have had difficulty repairing and maintaining their infrastructure even after government agencies' unsuccessful attempts to improve maintenance. On the other hand, Malawi and David (2016) emphasise that the public sector's failure to implement proactive asset management strategies may lead to underutilisation of the portfolio. This is evident in the excessive number of vacant properties that are not being used efficiently, as well as the lack of maintenance of existing buildings, which accelerates their deterioration. The absence of proactive asset management strategies has a direct impact on service delivery, as confirmed by Barret (2004), who notes that governments are under significant pressure to improve public services.

Urban blight, or urban decay, has significant socioeconomic, physical, and environmental implications. From an economic standpoint, it often involves real estate market failure, disinvestment, and declining property values in the surrounding area (Han, 2019; Newman, Park & Lee, 2018; Yakubu et al., 2017; Han, 2014; Gospodini, 2012). Additionally, low property taxes and increasing costs for community service delivery, along with strict regulations on local planning, are common characteristics of urban blight (Cheshire, et al., 2018). The physical and environmental aspects of blight are evident in the lack of maintenance which can lead to fires and building collapses. Additionally, studies of vacant buildings and the theorisation of methods to combat their negative impact must consider what groups are directly impacted the most. The negative effects of foreclosures and vacant buildings are primarily observed in low-income and middle-income census tracts, rather than in high-income census tracts. Azam et al. (2019) contend that imbalances in the property market and overbuilding can destabilise the financial system and pose risks to the broader economy.

The global issue of vacant, abandoned and unoccupied properties has been extensively researched, and the negative impact this problem has on the economy, residents and the environment revealed. Bearing this in mind, this paper's research examined how asset management is affected by various factors at different stages while considering how the significance of these factors will determine the most suitable asset management. This paper ultimately identifies three main categories (asset management, internal factors, and external factors), 22 sub-categories (such as asset strategy, skill sets, maintenance, technology innovation, and policy and regulation), and 70 specific factors that impact the vacancy of state-owned properties. This data will be looked at in further depth in later sections. Understanding the factors that contribute to the vacancy of state-owned properties is arguably the first step in improving asset management, and this paper acknowledges how previous research that identifies numerous factors has focussed primarily on private residential properties rather than those that are state-owned. This paper instead concentrates on the primary factors in the South African public sector that contribute to blight.

3. Research Methodology

The objective of this paper is to examine the internal and external factors that affect the management of state-owned properties in the Department of Public Works and Infrastructure (DPWI). The paper uses both a quantitative approach and utilisation of collected data from primary and secondary sources.

3.1 Data collection

Data was collected using self-administered questionnaires distributed to 165 employees of the Department of Public Works and Infrastructure. The participants included employees at various management levels (middle, senior, and executive management) in Real Estate Investment, Real Estate Management Services, Real Estate Information and Registry Services, Facilities Management and Construction Project Management. Also included were oversight and technical advisory services dealing with asset management such as the Strategic Planning Unit, Monitoring and Evaluation Unit and Internal Audit. The questionnaire was pre-tested with a small group of 5 senior managers before the final version – which contained 117 questions (115 closed-ended and 2 open-ended) – was developed.

The questionnaire is divided into three main sections. The first section gathered general information about the respondents such as their age group, gender, highest level of education, division or unit at work and number of years in their specific area of expertise. This information provided contextualisation for the data collected in the second and third sections. The second section focussed on the Department's approach to managing its assets and gathered information about the participants' knowledge of asset management. It included a specific focus on the link between corporate strategy and real estate strategy (CRES) as well as the key role players in managing state-owned properties. The third section helped participants identify both internal and external factors that they believe led to vacant and unutilised state-owned properties.

Purposive sampling was used to select participants from the DPWI who work in real estate investment, real estate management services, asset register management, facilities management, as well as oversight and technical advisory units. The participants were chosen for their specialised knowledge and insight into asset management in their roles within the company. Given the bureaucratic nature and sensitivity of the information within the public sector, permission was sought from the accounting officer to conduct the research. This helped to ensure the participants' willingness to participate in the research. The sampling method that was used allowed us to gather information that closely aligns with the research context (Bakkalbasioglu, 2020; Creswell, 2014). The Cronbach Alpha Test was subsequently used to assess the internal consistency and reliability of the data (Amirrudin et al., 2021; Dennick and Tavakol, 2011). According to Taber (2018), the alpha value ranges from 0 to 1, with a higher value indicating greater reliability and consistency of the data. In this study, a Cronbach Alpha value of 0.930 was obtained which indicates excellent internal consistency and reliability of the collected data.

3.2 Data analysis

The Relative Importance Index (RII) was used to rank the criteria based on their relative importance. According to Sakhare and Chougule (2019), the RII is a non-parametric technique widely used by researchers in the built environment – such as construction and facilities management – to analyse data that includes ordinal measurement of attitudes. Dixit et al. (2019) further explain that this is one of the most commonly used methods that provide highly accurate ratings for variables using a questionnaire. In this study, a five-point Likert scale of 1 to 5 was used, where 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree and 5 = strongly disagree. The following formula was used to calculate the relative index:

$$RII = \frac{ZW}{(A*N)} = \frac{5n_5+4n_4+3n_3+2n_2+1n_1}{5N} \quad (1)$$

In the formula above, W is the weighting given to each factor by the respondents, A is the highest weight and N is the total number of respondents. The RII value ranges from 0 to 1 with 0 not inclusive. According to Akadiri (2011), five important levels are transformed from RI values. These values are shown as follows:

Likert Score Interval (Mean)	**RII Score**	**Evaluation Criteria**
4,20 – 5,00	0.8 < RII < 1.0	High (H)
3,40 – 4,19	0.6 < RII < 0.8	High-Medium (H-M)
2,60 – 3,39	0.4 < RII < 0.6	Medium (M)
1,80 – 2,59	0.2 < RII < 0.4	Medium-Low (M-L)

1,00 – 1,79	0.0 < RII < 0.2	Low (L)

Table 1: The evaluation criteria of Likert scale (5-point) questions
Source: Author

4. Results and Discussion

The summary analysis of the RII is presented below in Table 2:

Table 2: Summary analysis of the categories and relative importance index

Category	Sub-Category and Factors	Total Respondents (N)	Average RII per category	Average RII per sub-category (per factor)	Item Mean
2. Asset Management (AM)					
	Total average for the Sub-Category		**0,630**		**3,110**
1	**Management, Skills and Business Processes**	105		**0,609**	**3,047**
2	**Asset Management Strategy**	105		**0,661**	**3,303**
3	**Resource allocation/Investment**	105		**0,623**	**3,116**
4	**Maintenance**	105		**0,595**	**2,973**
5	**Regulation/Framework and Policy**	105		0,664	3,318
3A Internal Factors (INF)					
	Total average for the Sub-Category		**0,598**		**3,042**
1	**Appropriate Organisational structure and vacancies**	105		0,532	2,659
2	**Business Processes/value chain and procurement processes**	105		0,636	3,181
3	**Strategy and Plans and reliability of Asset register information**	105		0,637	3,186
4	**Skills set**	105		0,631	3,155
5	**Maintenance plan**	105		0,623	3,155
6	**Culture and stakeholder relations**	105		0,556	2,778
3B External Factors (EXF)					
	Total average for the Sub-Category		**0,655**		**3,385**
1	**Industry expertise, skills and experience**	105		0,608	3,04
2	**Historical spatial planning and urbanisation patterns**	105		0,725	3,625
3	**Stakeholder Expectations and Confidence**	105		0,572	2,859
4	**Economic indicators and Market forces**	105		0,726	3,629
5	**New development patterns and alternative options**	105		0,698	3,49
6	**Technology and innovation**	105		0,458	2,288

Category	Sub-Category and Factors	Total Respondents (N)	Average RII per category	Average RII per sub-category (per factor)	Item Mean
7	**Public Sector-wide Planning and Policy**	105		0,728	3,642
8	**Leadership (political interference)**	105		0,693	3,467

Source: Author

Section 1 of the questionnaire provides participant details. Out of 165 participants, 105 responded to the questionnaire with a resulting 64% response rate which can be considered useful for analysis. General statistics are as follows: all participants are over 18 years old, with 44% female and 56% male; 68% work at the head office and 32% in regional offices; 51% hold lower to middle management positions, 40% are in senior management, and 9% are in other roles; 35% have junior degrees, and 65% are post-graduates; in terms of experience, 36% have less than 5 years, 23% have 6-10 years, 28% have 10-20 years, and 13% have over 20 years of experience; 64% have a Master's or Honours degree, and 28% have a bachelor's degree.

Section 2 provides details on Asset Management (item 2 in Table 2), while Sections 3A and 3B cover Internal and External Factors respectively. These sections are labelled as AM for asset management (including the value chain), INF for internal factors, and EXF for external factors. According to their responses, all participants (100% - 105 out of 105) confirm that the Department manages a significantly large portfolio of assets, indicating that the public sector owns a substantial number of assets.

4.1 Factors contributing to vacancy and underutilisation of state-owned properties

The RII results show that most variables have high to medium scores which range from 0.728 to 0.608 which indicate a strong likelihood of the factors mentioned above contributing to vacancy. Public Sector-wide Planning and Policy has the highest RII of 0.728 (as shown in Table 2). 61% of participants believe that planning in the public sector is generally poor and possibly due to a lack of skills and stringent regulations. Regulation-wise, 65% agree that zoning regulations have affected the allocation of assets to user departments while 6% disagree. The heavily regulated public sector, characterised by bureaucratic inertia, tends to compromise service delivery as shown by a high to medium RII of 0.636 in business and procurement processes. Over 62% of participants believe that the functionality criteria are not considered as leading criteria for awarding bidders. This corroborates with the findings of Bolton's study (2014) which argues that functionality criteria stipulated in the preferential procurement regulations have been highly constrained.

The questionnaire asked respondents whether the government has a strategy in place to manage its portfolio of assets. 46% reported that government has no strategy while 21% disagreed and 33% were uncertain. These findings strongly suggest that the Department has not implemented strategies effectively and has overlooked the impact of these factors in real estate planning. They also reflect the failure of the public sector to adopt strategies practised by the private sector, as has been suggested by Crittenden et. al. (2018). Inefficient strategies may be compounded by poor leadership and, at times, political interference in the operations of the Department. While 47% of the participants reported a leadership crisis, another 11% believed that leadership is not a significant factor in vacancy. In terms of the RII, leadership is rated high-medium (0.693) and ranks as the fifth overall contributing factor to vacancy. Malawi and David (2016) have emphasised the public sector's failure to implement proactive asset management. Additionally, Wojewnik-Filipkowska et.al (2015) highlighted the lack of a clearly defined strategy for managing assets.

The maintenance strategy for the state's extensive portfolio of assets is crucial. About 80% of survey participants feel that certain state-owned properties have been neglected over time, resulting in poor conditions. The majority of respondents (84%) believe that vacant and unused state-owned properties are in poor condition, suggesting a lack of proper maintenance. Without a maintenance strategy, the cost of maintenance may not be known. 54% of respondents

indicate that the cost of maintenance is unknown, while only 19% state that the actual cost of maintenance is known. The neglect of infrastructure operation and maintenance was highlighted by SAICE (2011) and strongly emphasised by Watermeyer and Phillips (2020).

Approximately 44% of respondents reported a lack of skills and expertise in property maintenance, while 37% reported a lack of skills in property portfolio management. The skill set is ranked 9th with a high-medium level RII of 0.631. While 65% of the respondents have post-graduate qualifications, the skill set of the respondents tells a different story: 44% lack skills in property maintenance and 37% lack skills in property portfolio management. This raises concerns about the correlation between qualifications and the practical skills required to manage state properties. Unskilled project managers are more likely to have a limited ability to oversee and manage maintenance activities in the Departments which leads to higher maintenance costs. There is an overall deficiency in the skill set required to manage real estate and property maintenance. The lack of private sector skills and expertise is a major concern in markets where the private sector is required to provide a service. 40% of the respondents reported this issue, while only 5% reported the presence of private sector skills. This conflict may be due to procurement processes that prioritise price over functionality, which could explain why most of the state buildings are in a state of disrepair (Pinzón and Schilling, 2016).

60% of the respondents have reported an increased interest and demand for privately owned assets and properties. This is supported by 76% of the respondents who prefer new developments, with 50% believing that the department fails to provide quality buildings and services when considering how most of the department's properties are over 100 years old. To address this issue, 72% of the respondents support public-private partnerships as a method of managing state assets and properties which may potentially create economic opportunities (Holmes, 2020). However, the growing interest in privately owned properties is countered by 44% of the respondents who believe that privately owned properties are not cheaper to secure than state-owned properties. Illegal occupation of state-owned properties poses a significant challenge to effective property management. According to 70% of respondents, the issue of illegal occupation of vacant properties is widespread, while 6% disagree and 2% strongly disagree. This situation complicates property management and results in municipalities losing out on tax revenue that could otherwise be used for renovations and maintenance. Johnson (2020) discovered that the illegal occupation of properties by refugees and homeless individuals hampers the public sector's ability to manage vacant properties. For example, Herbert (2018) points out that a combination of a declining real estate market and an abundance of vacant properties – alongside challenging economic and political conditions – has led to many low-income residents in the United States of America (USA) taking advantage of the opportunity to illegally use or occupy properties.

Table 3: The descending order of the factors most influencing vacancy of state properties

Category	Sub-Category and Factors	Average RII per category and sub-category	Ranking per category and sub-category	Importance level
External	Public Sector-wide Planning and Policy	0,728	**1**	H-M
External	Economic indicators and Market forces	0,726	**2**	H-M
External	Historical spatial planning and urbanisation patterns	0,725	**3**	H-M

External	New development patterns and alternative options	0,698	**4**	H-M
External	Leadership (political interference)	0,693	**5**	H-M
Asset Management	Regulation/Framework and Policy	0,664	**6**	H-M
Asset Management	Asset Management Strategy	0,661	**7**	H-M
Internal	Strategy and Plans and reliability of Asset register information	0,633	**8**	H-M
Internal	Skills set	0,626	**9**	H-M
Asset Management	Resource allocation/Investment	0,623	**10**	H-M
Internal	Business Processes/value chain and procurement processes	0,621	**11**	H-M
Internal	Maintenance plan	0,617	**12**	H-M
Asset Management	Management, Skills and Business Processes	0,609	**13**	H-M
External	Industry expertise, skills and experience	0,608	**14**	H-M
Asset Management	Maintenance	0,595	**15**	M
External	Stakeholder Expectations and Confidence	0,572	**16**	M
Internal	Culture and stakeholder relations	0,556	**17**	M
Internal	Appropriate Organisational structure and vacancies	0,535	**18**	M
External	Technology and innovation	0,458	**19**	M

Source: Author

Table 3 presents nineteen factors with results that show how external factors have the most influence on the vacancy of state-owned properties (42% or 9 out of 19). Internal factors are next at 32% (6 out of 19) and asset management factors are the lowest at 26% (5 out of 19). Fourteen factors are ranked in Table 3 at a High-Medium level and the remaining five at a Medium-Level.

The most significant external factor contributing to vacancy is arguably public sector-wide planning and policy (RII = 0.728), followed by economic indicators and market forces (0.726). Other factors related to urban planning include historical spatial planning and urbanisation patterns (0.725) as well as the emergence of new development patterns which often present alternative options (0.698) to existing properties. These factors have also been highlighted by Ferreira et.al (2022) and Cheshire et.al (2018). It is also clear that the public sector is not exempt from these factors. External factors have been shown to be the most influential in contributing to vacancy and underutilised state-owned properties in South Africa as a whole. The various factors shown in Table 3 are categorised as second (H-M) and third (M) levels of importance. These factors include a lack of strategy and plans, ineffective business processes and procedures, burden of regulations limited resources and inadequate skill sets – all of which contribute to the vacancy. External factors include market forces influenced by the economic landscape, historical spatial planning, urbanisation patterns and new development patterns that present alternative options for clients.

Economic indicators, such as consumption patterns, infrastructure investment and government spending, play a crucial role in strategic planning to improve asset management. The private sector's new development patterns also have a significant impact, particularly when they are

located away from the central business district (CBD). These patterns can ultimately limit or reduce the required services within the CBD. This in turn can lead to government relocation to areas where services are needed, leaving properties in the CBD vacant. These factors are therefore represented by a high-medium RII (0.726 and 0.698, respectively).

5. Conclusion and Recommendations

This paper ultimately focuses on factors that contribute to vacant and underutilised state-owned properties managed by the DPWI. It implemented the results of a questionnaire designed for the purposes of a specific analysis which revealed that it is predominantly external factors that play a significant role in property vacancy. The top five factors contributing to this vacancy are as follows: inadequate public sector planning and policy; economic indicators and market forces; historical spatial planning and urbanisation patterns; new development patterns and accommodation options; and weak leadership. The study concluded that assessing and understanding these external factors contributing to the vacancy of state-owned properties provides asset managers with valuable insights to consider when developing asset management policies and strategies. This understanding can also help in exploring innovative ways to improve asset management practices and potentially eliminate blight.

External factors therefore have a direct impact on policy. Policy implementation occurs in an environment where various actors are involved, and their interactions affect the process of policy implementation. Collaboration with the public and private sectors and their property developers and investors can help address vacancy issues, while infrastructure renovations and rehabilitation projects can in turn be funded through Public-Private Partnerships (PPP). In this arrangement, the private sector should agree to renovate, operate and later transfer (ROT) the asset back to the public sector – bearing in mind how the transfer typically occurs once the contractor has recouped its investment or after an agreed-upon period of time. The renovated properties can as a result be used for economically viable purposes, such as creating businesses that could provide employment for the youth and therefore make a significant economic contribution to the South African economy.

This partnership approach can serve as a model for other developing countries dealing with property vacancy issues in how they should thoroughly assess their policies impact state property and service delivery. It must be considered that factors that contribute to vacancy include migration policies, urban renewal programs, new developments, especially outside city centres, and criminal syndicates taking over buildings. Furthermore, developing countries in the early stages of democracy must consider how the transition and institutional arrangements affect the management of state property.

The results from the data analysis lead to a recommendation that the Department of Public Works and Infrastructure should implement professional development programs to address the skills gap, especially in the context of new asset management strategies and models. The conclusion of this paper's analysis suggests that the Department collaborate with other government departments to improve public sector planning, coordination and policy alignment as part of the inter-governmental relations framework. This will ensure that the planning of public asset use for service provision takes into account urbanisation patterns, socio-economic changes and environmental factors. An integrated planning approach with all levels of government will also aid in determining asset management and maintenance strategies, alongside informing decisions on when to dispose of certain properties. This is important as

the disposal of assets in the market can generate revenue which can be reinvested in maintaining other government assets.

The public sector needs to completely revamp the current policy framework for managing state property by removing political influence and interference in the management processes and asset management value chain. Additionally, the sector should prioritise efficiency and functionality over the lowest price when implementing a procurement system, ensuring that contractors have the necessary experience and track record for the job. This will improve the overall procurement system and reduce the potential for corruption, ultimately addressing the vacancy problem. Close analysis via the implementation of questionnaires and data analysis ultimately shows that external factors such as economic and environmental conditions have a bigger influence on blighted properties than internal factors. This highlights the importance of reassessing current asset management strategies and exploring new principles and models. Key priorities to address the vacancy problem should include the implementation of an appropriate asset management model, maintenance plans, skills assessment, an infrastructure-driven procurement regime as well as stakeholder management. Further research is needed to identify suitable strategies for the state to adopt that take into account the constantly changing external factors and limited financial resources.

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Self-Governance in Condominium Housing in Tanzania: Performance, Dilemma and Sustainability

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Abstract

Despite the ever-growing preference for self-governance in diverse, multi-unit buildings in cities around the world, scholarly discussion on how this form of housing is governed and the potential inefficiencies with self-governing since the 2010s in the Global South is both limited and presented anecdotally. Reflecting on Ostrom's common pool resources principles, the study highlighted patterns of interaction to establish whether commonly held views about self-governance are borne out in practice. A case study approach used involved surveys of condominium homeowners and interviews with house management committee chairs or members. In addition, a document review was conducted. Findings showed underlying forces that prevented functional and sustainable self-governing communities are unsatisfactory participation and weak enforcement of house rules. These are driven by conflicting interests among homeowners, lack of adequate information, discrepancies in legal processes, and ineffective dispute resolution mechanisms. Such issues have the potential to damage building social cohesion. Hence, the study stressed implementing plausible dispute resolution mechanisms, preparing guidelines and standards on how condominiums can be effectively governed and ensuring individual cooperation and free-riding issues are avoided. Understanding the behaviour of individuals within a space for interaction is also crucial for self-governing institutions to function successfully.

Keywords: *housing, condominium, dilemma, sustainability, sub-Sahara, Africa*

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1. Introduction

The concept of condominiums as 'self-governing communities' is embedded in the management and governance of common spaces and systems in this form of housing or unity property, both in the developed economies of Europe, America and Asia, and many other countries in Africa (Treffers & Lippert, 2020; McKenzie, 2011; Adamu, 2012). As synthesised by McKenzie (2011, 222), this "collective action paradigm" holds that condominiums are relatively self-governing, autonomous communities. Homeowners are permitted under certain rules to guide their operations to collectively govern common spaces and assets without external influence. Thus, this model is seen as a vehicle for enforcing standards of behaviour designed to foster greater social cohesion. Moreover, to protect the property and secure long-term success.

However, for homeowners and researchers, the implementation of the self-governance system in the governance and management of condominium housing has been something of a puzzle (Treffers & Lippert, 2020; Kenna & Stevenson, 2010). Evidence suggests this "collective action paradigm" is not only regularly contested on a scale not seen from other forms of housing management (Chen & Webster, 2005; Low *et al*, 2012), but housing managers are under increasing pressure to demonstrate that their services centre the homeowner and continuous performance improvement is delivered (Treffers & Lippert, 2020; Adamu, 2012). This is against its premise of sustaining common ownership arrangements that are relatively autonomous, self-sufficient, and governable by its members (McKenzie, 2011). As a result, much of the last two to three decades has seen low participation of homeowners in collective action. Participatory democracy in the delivery of management services has failed to meet simple homeowner thresholds required functionally effectively (Lippert & Steckle, 2016; Lippert & Treffers, 2016).

In response to the discrepancy, Tanzania introduced a new approach to the management and governance of condominium housing in 2008. The Unit Title Act (UTA) 16 of 2008 demarcates how homeowners can collectively enforce joint ownership and responsibilities over the common property through HOAs – self-organised homeowners' associations (UTA, S35-S40). These responsibilities include the power to enact house rules, mediate disputes, preserve the value of a property, and monitor both the living environment and arrangements. Despite this supporting policy provisioned, persistent conflicting expectations among homeowners often end up in the press or the courts challenging the idea that the "collective action paradigm" can effectively address management issues in Tanzania's condominium housing sector (Masinde, 2006). Similar evidence has been noted across several countries in Sub-Saharan Africa (Baboolal-Frank, 2020; Adam, 2012; UN-Habitat, 2010). Given the constraints the collective action regime must operate, it is critical that any gaps in the governance and management services are identified.

Yet, scholarly research undertaken to examine how condominium homeowners perceive their housing management implemented by HOAs and the governance problems that have overshadowed it since the 2010s in Tanzania and broadly cities in the Global South is surprisingly limited in its scope, dated and most are presented in anecdotal form (Haregewoin, 2007; Masinde, 2006). Even though, condominiums as self-governing spaces are a recent phenomenon for several African countries experiencing unique challenges in planning and execution Masinde, 2006; Adam, 2012). South of the Sahara, Adamu (2012) observed that self-governance was challenged by institutional discrepancies characterised by an inability or difficulty in designing effective

collective action rules. Nevertheless, the study was conducted ten years ago. For this reason, the lack of a consistent view of the house management system limits an appropriate strategy to preserve the value of a property and provide a safe and comfortable living environment (Smith, 2002; Walker, 2000; Miles *et al*, 2007).

Within the condominium housing sector in the Global North (GN), an internal debate commenced on the nature, role and place of inclusivity and participatory democratic arrangements, free-riding, or divergent interests or unchecked influence from external professional experts within the management and the governance model of common spaces and systems in condominium housing (Easthope, 2019; Easthope & Randolph, 2009; Lippert, 2019; McKenzie, 2011). The "scholarly debate" of the GN acknowledges that this housing this faced with various governance challenges. These issues differ by country and extent. This literature is framed on how housing management tasks are performed jurisdictionally in changing social, political and economic processes. Therefore, it is of limited use in answering the questions posed in this research on the Global South (Kenna & Stevenson, 2010); Lippert, 2019; Lehavi, 2015).

Against this background, three main issues need to be examined. Firstly, what explanations can be provided for the management problems the in condominium housing sector in Tanzania and generally in the Global South? Secondly, in promoting collective action, what are the wider governance and management consequences for different groups in Tanzania and the Global South? Thirdly, could the collective action in the condominium housing sector in Tanzania and the Global South facilitate instead of hinder management and governance in sustainable and meaningful ways as suggested by Ostrom's (1990: 90) common-pool resource (CPR) theory. Drawing on Field's (1997) definition, sustainability is a process that can be maintained over the long run without impairing the fundamental ability of the underlying asset to support future needs. Geographically, this study focused on Tanzania, but the literature from sub-Saharan Africa and other countries is analysed and discussed.

This paper therefore argues that addressing the above issues is critical to understanding the outcomes of the last 15 years of condominium housing management and governance in Tanzania. How these issues are answered and the resulting policy choices made based on the findings support advancing knowledge and the prospects of self-governance as a model for condominium management in emerging markets in the Global South with similar housing policies and legal frameworks. The findings provide the opportunity to explore how buyers of condominiums maintain their property rights and autonomy, while still contributing to the resolution of housing problems. Also, the unique character of this research is due to the empirical evidence on the case for and against the performance of self-governing systems within the continent to communicate Africa's condominium management story. In so doing, the paper highlights good practices and approaches proven successful in other emerging markets. These could be adaptable to the circumstances encountered in Tanzania.

The importance of this study is further highlighted in the declaration of Sustainable Development Goals (SDGs). As such, the limited research available not only prevents governments from understanding condominiums' legal and institutional designs but undermines governments' efforts to achieve SDG 11. This goal seeks to ensure access for all to adequate, safe, and affordable

housing and basic services. Thus, these findings could assist in identifying effective ways of closing management and governance gaps and prioritising which gaps to focus on.
The next section presents theoretical issues applicable to the evaluation of self-governing institutions within the common pool resource (CPR) structure using Ostrom's design principles. Section three provides an introduction to condominium housing management practice in Tanzania and its aims and their intended or unintended consequences. Section four discusses the research methodology, while section five demonstrates the research results. The results are then linked to the existing body of knowledge. Thereafter, the key inferences from the analysis are made. Finally, recommendations from the study are provided.

2. Condominiums Collective Action as a Common Pool Resource Regime

To understand the effect of collective action on condominium management performance and homeowners' behaviours, the common pool resource (CPR) theory is applied. Developed by Elinor Ostrom (1990), the theory examines the notion of joint governance. It conceptualised the most efficient ways to manage a class of goods known as "common-pool resources" or simply the commons. Her argument noted goods are not simply "public" or "private" goods, but are "common-pool resources" with the characteristics of public and private goods. However, these features need not necessarily be attributable to private or public goods (Ostrom, 2009a, 2012b). The consumption of common-pool resources is always non-excludable in access but rivalrous in consumption (Ostrom, 1995: 7). There are interesting cases of goods and services large enough to make it costly to exclude potential beneficiaries for everybody to enjoy (Ostrom, 1990: 30). While the optimal sharing group is more than one person, consuming common goods and services does not reduce the possibility of someone else having the same opportunity for consumption. The second dimension is "subtractability" or competition in consumption. Goods that are depleted in consumption are rivalrous (subtractable) in consumption because one person's appropriation of a resource reduces the availability of that resource for others.

The best example of a common good in condominium housing is common spaces and assets. These include lifts and staircases amongst others once labelled for consumption. Under normal circumstances, access to these common spaces and assets cannot easily be restricted to a homeowner/resident unless access to the housing facilities is limited by membership restrictions. Homeowners (or residents) also experience non-rivalry in consumption when one person's use of a balcony or parking space affects the opportunity for others to use it. Quite often common pool resources are susceptible to incidents of free-riding and the tragedy of exclusion (Ostrom, 1990: 60; Hardin, 1968). Hardin (1968: 1247) stressed the tragedy of the commons could arise from some lack of consensus and/or appropriations of common-pool resources by greedy societies or the self-interest of users. Leading to the loss or exhaustion of the resource appropriators were supposed to preserve.

The experience of dilemma in condominium housing conforms to what Ostrom (1990) discussed. For instance, it is difficult to stop a homeowner from using the "common property". Thus, self-governing communities are likely to face a similar dilemma when undertaking numerous governance responsibilities to manage and sustain living arrangements. Such dilemmas range from not making housing payments on time, not participating in decision-making meetings, and non-

adherence to house rules (McKenzie, 2011; Chen & Webster, 2005; Bandy et al., 2010; Low et al., 2012; Vihavanien, 2009; Adamu, 2012).

The (CPR) theory's direction to escape the exploitation of common resources involves a model of governance based on individuals working jointly together for a common end rather than functioning through the market or the state (Ostrom, 1990: 31). In other words, the theory states that beyond the institutions of "market" and "state," there is a third institution: the community. Thus, Ostrom (1990) and those committed to her work like Frischmann (2013), Pennington (2012) and Tarko (2012) claim this occurs when a system of working together is created. That is, through a self-organised and self-governed system the commons are sustainably managed and governable. Notably, resource users would establish a system that benefits everyone involved while protecting the CPR for long-term use. Therefore, diverting attention from the challenges described in Hardin's Tragedy of the Commons and free-rider.

For these individuals to succeed, the CPR theory lists a set of principles for common self-governance (Ostrom 1990: 90; Obeng-Odoom, 2021: 55). These principles constitute the Ostrom IAD framework described in Plate 1 below. Ostrom's design principles introduced a specific approach for analysing a wide range of resources that are consumed collectively such as shared common areas and facilities in condominium housing. The five design principles concern: boundaries, membership, rule-making, monitoring, sanctioning, conflict-resolution mechanisms of the regime and recognition by authorities.

According to Ostrom (1990), the boundary principle is concerned with understanding resources being shared. The principle highlights focusing the analysis on physical assets and membership. In the context of this study, this implies homeowners must know the spatial limits of their common spaces and facilities, as well as who is included or excluded in the collective process. Key to interpreting the collective action principle is identifying essential action situations, the role performed by each actor within the action situation, and appreciating their motivations and beliefs The principle further states the rate of participation in accomplishing the action situation determines the effectiveness of the self-governance regime. The principles also underscore that rules governing all aspects of CPR regimes must be established by those who use them. Equally, there must be a congruence between the collective action rules relative to local practices and the nature of the individuals. Thus, a particular concern of this study is to understand whether the rules and mechanisms put in place were collectively enacted and ensured effective monitoring of the house and living arrangements contrasted with sound sanctions on what could be achieved under alternative arrangements.

Finally, the other three elements of the design principles show the significance of the CPR regime to monitor areas of risk, implement sanctions and determine whether changes are needed to improve the effectiveness of a monitoring system (Ostrom, 1990). Accordingly, a key part of the analysis concentrates on whether the regime monitors the condition of the physical structure, facilities and tasks performed by the property managing agency efficiently. If counterproductive and deleterious behaviours are monitored, and whether those responsible for monitoring the condition of the commons are accountable to the appropriators This is followed by an examination of potential inefficiencies within the enforcement of sanctions and examining the case for and against the efficiency of dispute resolution mechanism in self-governing communities.

Plate 1: Ostrom's Design Principles for Successful Governance of the Commons

1. **Clearly defined boundaries:** Individuals or households who have the right to withdraw resource units from the CPR and the boundaries of the CPR. In 2012, the principle of clarity of boundaries was expanded to incorporate clarity on users' boundaries (Ostrom, 2012b).
2. **Congruence between appropriation and provision rules and local conditions:** Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labour, material, and/or money.
3. **Collective-choice arrangements:** Most individuals affected by the operational rules can participate in modifying them.
4. **Monitoring:** Details the audit CPR conditions and appropriator behaviour and the process of accountability for appropriators.
5. **Graduated sanctions:** Appropriators who violate operational rules are classified as graduated sanctions (depending on the seriousness and context of the offence) by other appropriators, officials accountable to these appropriators or both.
6. **Conflict-resolution mechanisms**: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7. **Minimal recognition of rights to organise**: The rights of appropriators to devise their institutions are not challenged by external governmental authorities.

Source: Obeng-Odoom (2021: 55)

Therefore, this paper argues the peculiarity of condominium housing exposes it to multiple points of vulnerability. The performance and sustainability of condominium self-governing communities cannot be understood without a comprehensive grasp of the interaction between homeowners shaping collective action and what is available at the critical stages throughout the self-governing process. More so, it positions the pillars to govern common property to resemble Ostrom's design principles. In one sense, the study argues the framework combining CPR theory and Ostrom's design principles is useful for understanding and analysing performance and dilemma experiences in a self-governance system. Building on this theoretical framework, three issues are of interest: the notion that self-governance prevents inclusivity and participatory democratic governance of condominium management in Tanzania, an examination of how condominiums are governed, and the potential inefficiencies within self-governing communities.

3. Management Approach of Condominium Housing Commons in a Tanzania Context

The governance and management of unity property in Tanzania is led by the Unit Title Act (UTA) No 16 which came into effect in 2008. In this form of housing, the units of real property are owned by an individual for their exclusive use. While the "commons" are held in co-ownership for common use. The unity property consists of several forms: high-rise structures in a row or terraces or a cluster form whereas the common property refers to common spaces and assets which

everyone in the building has a common right to utilise. As such, every homeowner has the right of ownership in the commons areas which is equal to the size of the fractional share. Through this clear distinction of what constitutes the commons and individual units, it is possible to treat condominium "commons" as a common good. Its use may be categorised by the tragedy of the commons perspective. Thus, the enactment of the UTA strengthens the management and resolution of disputes arising from the use of the common property.

The statutory reform preference for collective action ensures homeowners can individually and jointly take simple steps to address the housing condition question (UTA, 2008, S6). In this way, condominiums are treated as self-governing communities, in which self-organised homeowners associations (HOAs) are responsible for the enforcement of by-laws and the control and management of the commons and assets on behalf of homeowners (UTA, 2008, S40). HOAs are neither business enterprises nor professionalised associations, but non-profit housing management organisations (UTA, 2008, S35 & S36). They are created from the bottom up when more than four units have been privatised and only existing homeowners may form or join associations (UTA, 2008, S35). It is expected that HOAs perform in line with regulatory requirements from the UTA and house by-laws. This legal requirement makes HOAs a 'genuine' common pool resource since no owner of the unity can be excluded.

The managerial dynamic anticipates condominium self-organized homeowners' associations to also operate based on democratic principles. Under this form of organisational implementation, a permanent management committee is formed regarded as a 'House Management Committee' (UTA, 2008, S47). It monitors the activities of the HOA and serves as an executive organ of the association. The committee is elected by a common meeting where members are exclusively the homeowners led by a chairperson. The management tasks are assumed by an external property managing agent (PMA) as per section 49 of UTA that provides the desired services to the organisation. However, the responsibility for strategic house management rests with homeowners through their organisation's management committee, whilst joint decisions take place at a general meeting (UTA, 2008, S40). The voting rights, however, depend on the unit factor of the unit (UTA, 2008, S44). This means the owner of a larger apartment has more votes than the owner of a small apartment. Though a unit owner may exercise their voting right personally or by proxy (UTA, 2008, S44), two-thirds of all the association's votes are required to make decisions about fundamental matters of the association. An HOA has the power to make its own set of collective choice rules within the constraints of provisions specified in the UTA giving homeowners slightly different experiences. The contents of the house rules are discussed and agreed upon in a common meeting (UTA, 2008, S50).

Overall, the management approach illustrates the importance of the partnership between the residents and the professional property management agency. It also highlights the importance of sustainable house management and the involvement of both the homeowners in reaching this goal. The fundamental question is: To what extent does this management setup constitute a compelling solution to condominium housing governance and management questions? Drawing on the theory, this research makes the following argument: Implementation of policies patterned after the CPR regime concept is problematic as may lead to major social costs.

4. Research Methodology

4.1 Research Design and Cases

The study followed a case study approach that administrated a survey to condominium homeowners. Interviews were conducted with house management committee chairs or members from condominium self-organised homeowners' associations. To further enrich the study, a document review was done.
Based on the purpose of the study self-organised condominium homeowners' associations were conveniently sampled. This reflected a wide range of condominium attributes in Dar es Salaam. It was purposively selected from a list of ten profiled condominium establishments accessed by the National Housing Corporation (NHC). The city has one of Tanzania's highest condominium housing stocks and experienced an upsurge in demand across all social classes compared to other cities and urban centres in Tanzania. This trait enabled easy access to information for the study to maximise for research.

On the other hand, the selection criteria for buildings comprised of three factors: active HOAs with over five years of experience in performing housing management functions, diversity in condominium typology and homeowners. The case studies included two "row-rise"; and three "high-rise" buildings with active HOAs (see: Table 1). The buildings were also chosen to include exclusively privately owned units based in both the city centre and in suburbs that accommodated large inventories of the units ranging from 200-500. Furthermore, the sample contained new single-story, semi-detached, shared-equity ownership (SEO) buildings mostly located in the suburbs. Designated as "Row-Rise Building" (RRB) in this study, these new categories of single-story, semi-detached condominiums had a high proportion of homeowners of which the majority were in the middle or lower middle-income bracket. Other condominiums designated as "High-Rise Buildings" (HRB) chosen included the newly built and modern high-rise buildings located in the city centre accommodating a mixture of high- and medium-income earners. This research design helped determine whether homeowners' attributes are more likely to facilitate or hinder collective action using condominium technologies as a control variable. To preserve anonymity, the selected buildings and corresponding HOAs have been assigned random numbers rather than using their real names.

4.2 Data Collection

The information of this study was gathered using a series of well-structured questionnaires for condominium homeowners' representatives, semi-structured interviews with selected board members and document reviews. Document analysis was carried out to understand the legal and institutional framework guiding the self-governance concept and its operations in condominium properties. This involved engaging with the Unit Titles Act of 2008, The Land Act of 1999, and other relevant documents in printed and electronic form. A literature review was also performed on a framework which empowers owners of "Unit Property" to exercise their rights and facilitates them in Tanzania.

The questionnaire was the primary data collection instrument. This approach was adopted to facilitate systematic measurement and analysis of variables to generate themes. The questionnaire

was organised into five sections: (i) how collective action is conducted, (ii) the work involved in collective action, (iii) patterns of interaction and outcomes, (iv) potential challenges or pitfalls and (v) how to avoid them. As such, the structured questionnaire contained a mixture of open and close-ended questions. The questionnaire utilised a five-point Likert scale, ranging from 1=very dissatisfied/strongly disagree to 5=very satisfied/strongly agree. The use of the response category "other or explain" was included to capture the underlying cause of the issues noted. Ostrom (1990) asserted there is use in analysing action situations to understand the incentives, values and beliefs facing users of common resources.

The survey was administered to 255 condominium owners residing in five buildings selected. A simple random sampling method was used to select the representative condominium homeowners. This procedure ensured each homeowner in the selected case studies had an equal chance of selection. In this study, Yamane's (1967) sample size determination model (equation 1.0) was used to get reasonable information from each selected condominium building. In expression (1.0) n is the sample size N is the population size to represent the total number of unit owners in each condominium property, and e is the level of precision. A 95% confidence level (i.e., 5% level of precision) was allowed. Table 1 presents a summary of respondents drawn randomly from each the of selected buildings.

$$Sample\ size\ (n) = Population(N)/(1 + N(e)^2\ ) \qquad (1.0)$$

Table 1: Summary of Valid Responses

SN	Condominium	Category	Population of Co-owners	Sample size	Valid Responses Per	
					Building	Cluster
1	Case 1	High-rise	60	40	33 (83%)	134 (69,43%)
2	Case 2	High-rise	88	50	45 (90%)	
4	Case 4	High-rise	120	60	56 (93%)	
3	Case 3	Row Building	60	35	18 (51%)	59 (30,57%)
5	Case 5	Row Building	201	70	41 (59%)	
	Total		**529**	**255**	**193**	**193**

Source: Author's compilation (2020)

Out of 255 questionnaires, 193 were returned (Table 1) suggesting an overall response rate of 76%. Out of 193 valid responses, the responses from high-rise buildings were approximately 134 (69,43%), while in row-buildings were 59 (30,57%). The high response rate is due to questionnaires administered and collected in person by trained assistants in the Kiswahili language. The study also conducted semi-structured interviews primarily with board chairs and members from five cases Interviewees were purposely chosen based on their role and experience in condominium governance in their establishments. All interviews with the house management committee chairs or members were conducted face-to-face at interviewees' workplaces by the researcher.

Interviews were exploratory in nature and interview questions directly reflected those found in the survey. They were designed to collect in-depth information on the present collective action environment and the consequences. It assisted with refining the data collected in the questionnaire. Interviews were semi-structured to allow for an ongoing process of follow-up questions (Strauss & Corbin, 1998). In addition, interviews proceeded to validate the results. The respondents and interviewees were guaranteed anonymity.

A substantial number of fact-finding visits and consultations with key stakeholders involved in the condominium management were sent out to retrieve primary data. The pilot survey and interviews were conducted in the last quarter of 2019 and the final phase of the survey and interviews were conducted in August 2022. Multiple data sources allowed the analysis to triangulate the data obtained by looking at issues to identify, processes to increase the validity and reliability of the research outcome and its decision (Easterbrook et al., 2008).

4.3 Data Analysis Techniques

For analysis, the Statistical Package for Social Sciences (SPSS) was used to compute descriptive statistics and statistical tests. The overall level of satisfaction was obtained by calculating the relative importance index (RII) of all surveyed respondents' ratings across small (RRB) and large (HRB) condominiums. Each of the factors evaluated was rated according to the pre-determined rating scales. Conversely, thematic analysis was used to code the themes and concepts arising from the qualitative data. We then used the qualitative findings to corroborate the survey findings. Both the quantitative and qualitative methods had the same priority status (Molina-Azorin, 2007).
It is from the aforementioned methodological approach that the study demonstrates in the section that follows how the self-governing HOAs succeed in practice in managing their commons and the key drivers for success or failure in the Tanzanian context based on the data. A key strength of the approach adopted in the study is that it reveals the precise prevalence of the identified governance issues and accounts for the impact of size on governance issues.

5. Results

The analysis and presentation of results are structured in two main themes. The first part focuses on self-collective governance that provides incentives for homeowners to contribute positively to condominium management and the resulting patterns of interaction. This is then followed by an analysis of performance and the dilemma of self-governance.

5.1 Collective Governance and Factors Precluding Participation

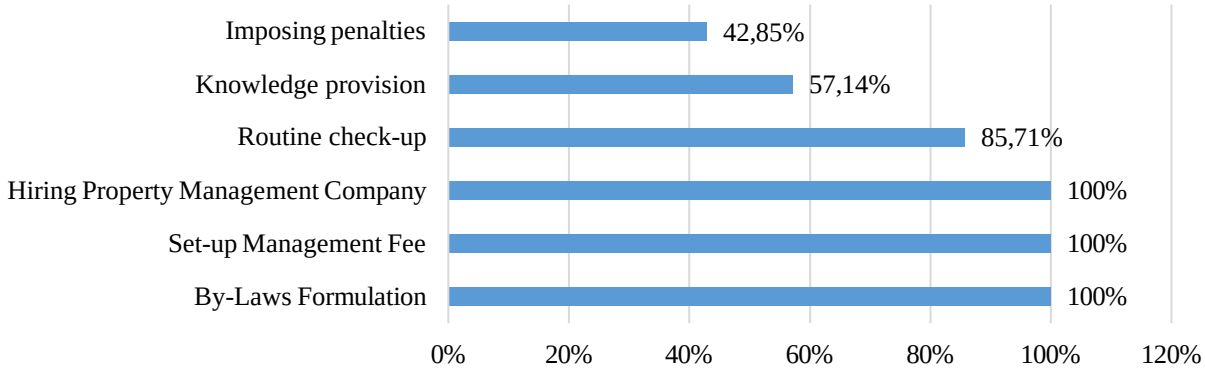
From the survey, three main influences were identified in Tanzania that shaped how condominium homeowners defined and delineated their role whilst interacting with their organisations.

5.1.1 Does Democratic Collective Governance Envisioned in UTA Translate into Practice

As one aspect that forms the pillars of self-governance, democratic collective governance in common parlance materialises when homeowners participate effectively in all-important matters of condominium governance (Ostrom, 1990: 90). To test this view in practice, an open-ended question asked respondents to identify action situations occurring at all levels within self-governance that had physical participation. The responses were then grouped into six general categories in order to better understand them (Figure 1). Overall results showed that homeowners participate in condominium governance but not equally across a number of management functions. The mean level of participation was 80%.

One significant finding was the rate of participation for homeowners was much higher in non-repetitive tasks such as hiring PMA, enacting house by-laws or determining management fees, but declined significantly in repetitive tasks. The latter included monitoring and enforcement of house rules alongside information provision. Coupled with the difficulties that homeowners face this resulted in limited knowledge and experience in dealing with management-related matters. It explained the mere 42% of homeowners who participated in enforcing house rules and the 57% of respondents who participated in monitoring and shaping their living arrangements. These shortfalls could have been mitigated if proper incentives were in place. This also highlights the critical element of Tstrom's design principles, namely the relevance of good relationship management.

Figure 1: Owners' Main Area of Involvement in Management Process



Author's calculations using survey data

5.1.2 Factors precluding effective participation in self-governance

Homeowners' response to the question, "what are the dominant factors that preclude participation in decision-making?" pointed to conflicts among homeowners during decision-making meetings or the desire to influence decisions. These were the primary mechanisms driving poor participation. A respondent remarked:

> Some homeowners attending the meeting are motivated by their own interests and thus, discouraging others from participation.

Some interviewees who were members of the HOAs committee commented that full participation cannot easily be achieved because of absentee homeowners. One interviewee shared:

> It is impossible to gather the whole house unless is at the point of crisis. Some homeowners find it difficult to participate because they don't live there themselves.

Likewise, the data showed that a lack of information is another possible reason discouraging homeowners from contributing to collective responsibilities. One homeowner, for example, described: *They think that self-governance is only about contributing money only".* This view is substantiated by the survey data. For example, the analysis revealed between 10%-28% of respondents confirmed that they were indifferent because they felt that they could not influence any events.

Another respondent extended the argument by linking poor participation to diverging interests:

> Many homeowners chose to buy apartments not because they were committed to the concept of collective ownership and self-governance from the start, but perhaps because that was the only choice they had.

Overall, the numerous perpetual governance problems that have plagued participation in decision-making could have been averted with proper awareness sessions. This also highlights the important aspect of relationship management within self-governance discussed below.

5.1.3 Adopted Mechanisms to Ensure Commitment by Homeowners

Respondents were asked to highlight mechanisms used to overcome and ensure active participation among unit users. Reflecting on the question, one interviewee claimed that low participation had contributed to the realisation that the self-governance regime needed what he called "an alternative form of participation". This included *"submitting ideas for improvements in writing or direct in the office".* This was illustrated by other interviewees who said: *"alternative participation solves the problem of low attendance"*, *"causes the association to work better"*, and *"creates solidarity among homeowners".* These respondents expressed that learning and adaptation to a changing environment are critical to the success of self-governance.

5.2 Performance and Underlying Dilemma Facing Self-Governance

In condominium housing, the self-governance role is not portrayed solely by relationship management. It has expanded to monitor the condition of the common spaces and facilities for and on behalf of homeowners (UTA, 2008, S40). The ability to perform these functions consistently as underlined in the design principles is of importance to any self-governance. Without compliance,e Ostrom (1990) suggests the existence of a successful self-governance is difficult. Thus, it was of utmost importance to establish how these principles are fulfilled in practice. The survey attempted to understand the level of satisfaction on three major components: (i) monitoring the condition of the physical structure, facilities and tasks performed by PMA such as cleaning, landscaping, and repairs; (ii) management of homeowners' relationships; (and iii) the ability to plan and implement preventative maintenance.

5.2.1 Monitoring Mechanism Plagued by Lack of Capacities and Complicated Procedures

It is evident from Table 2 that a majority (67%) of respondents were satisfied their self-governing communities were effective in relationship management. It is also evident that the unit owners residing in High-Rise Buildings (HRB) are overall happier than those residing in Row-Rise Buildings (RRB). It must be stated that the units of HRB were newly built units located within the city centre and the units of RRB were row/terrace buildings situated outside the city centre.

Monitoring is not only about managing relations. It functions to monitor the work of the PMA and rules to get insights that can be used to manage and sustain the buildings and living arrangements. In relation to this, Table 4 illustrates that a high percentage of homeowners were not satisfied with the self-governing communities in terms of monitoring physical structure, operating facilities and the task performed by hired PMA (i.e., 62%) and conducting preventive maintenance (56%). It is also evident that the unit owners residing in HRB were unhappier than those residing in RRB. Compared with the previous analysis the problems in managing multi-unit buildings persist in Tanzania despite statutory reforms. In 2006, Masinde (2006) revealed that more than two-thirds the homeowners were not satisfied with the quality of housing management.

Overall, it is of uttermost importance for self-governing institutions to ensure that management functions respond positively to current and future needs to be successful and sustainable. If a self-governance regime neglects monitoring of the physical structure and PMA, the resulting property damage can cause conflicts among homeowners or between homeowners and governing institutions or encourage non-participation thereby undermining the success of the self-governance.

Table 2: Level of Satisfaction on Relationship Management and Monitoring of Common Property

Aggregate Indicators	**Overall Level of Satisfaction**			**Relative Importance Index**	
				High-Rise Buildings	**Low Buildings**
	Satisfied	**Less Satisfied**	**Not Satisfied**	**RII**	**RII**
Relationship Management	67,35%	22,79%	9,84%	0.87	0.84
Planning and Executing Preventive Maintenance	44,04%	39,38%	16,58%	0.74	0.80
Monitoring of Physical Structure and Tasks performed by PMA	39,89%	41,96%	19,17%	0.71	0.74

Source: Author's calculations based on survey data

In an open-ended question, respondents were also asked to isolate possible factors clouding the active monitoring function of common spaces and systems, living arrangements and tasks performed by PMA. However, responses indicated the dilemma was coming from a wide variety

of sources as self-governing communities deal with complex and multi-dimensional governance tasks. Nevertheless, the dominant factors identified included behavioural explanations and weaknesses of the condominium legal framework.

The survey result shows there are two broad aspects of irrationality: slowness to respond to management issues and failure to incentivise homeowners to collaborate. Figure 2 identified that 45% of concerns with failure actions were centred on issues to do with a mismatch between the skills and abilities of those who are responsible for monitoring and the general process required for an intervention. One respondent indicated:

> Major tasks or activities in the building are not done properly.

Another respondent added:

> A big challenge for the house management committee is to know when to intervene.

The lack of responsive and timely in-service delivery is frequently correlated with the inoperative collective-choice arrangements in Sub-Saharan Africa. Adam (2012) observed in Ethiopia such problems become critical when condominiums are largely occupied by renters because of their limited rights. Having said that, 41% of respondents suggested they experienced a sense of failure in motivating homeowners to author specific rules and sanctions in a meaningful way. For them, it signified a lack of broad knowledge and experience required to self-govern.

Moreover, a self-governing institution's health is also a crucial part of a successful regime. Financial health depends on two important aspects: ensuring the regime has enough resources to fulfil its function and considering if its financial condition is not under threat. The analysis found that around 50% of homeowners were unsatisfied with the assessment and collection strategy (Figure 2). The dissatisfaction is the result of a poor collection method, complex payment processes or a failure of the collection process to avert possible defaults. Expounding on the issue, some respondents indicated:

> Completing the service charge payment process regularly is costly in terms of both time and money.

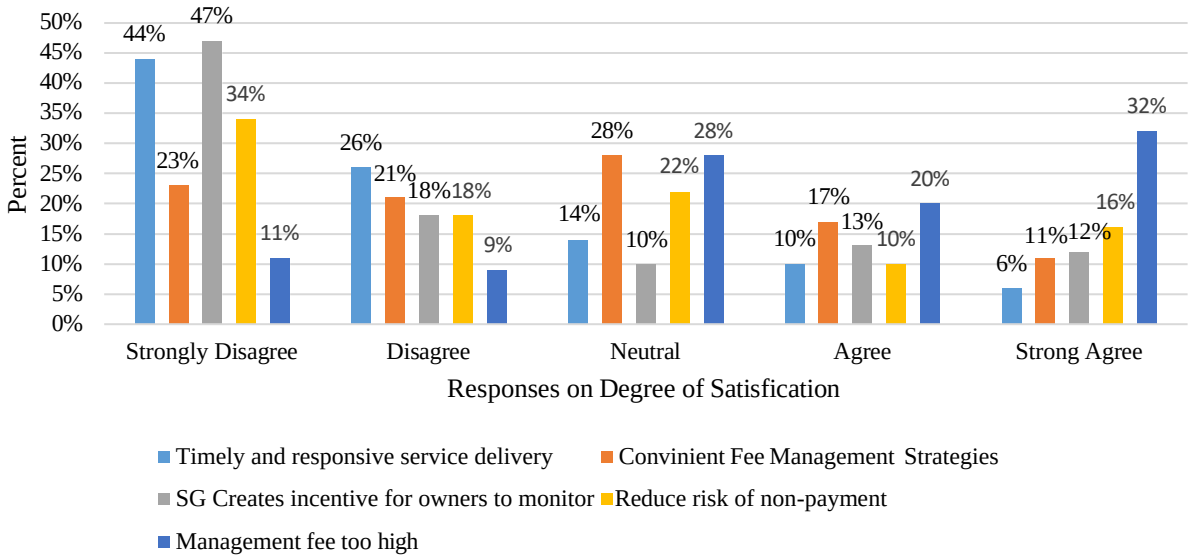
Another respondent reflected a similar view:

> Determining service charges often involves lengthy and erratic decisions.

In this instance, 52% of homeowners indicated the management fees were higher than what most homeowners had expected or were perceived to be required[i] to maintain and manage the property. This approach leads to default charges that impact the institution concerned (see: Figure 2**)**. One of the respondents suggested that because charges were not affordable to many homeowners it "can attract non-payment" which in his own words, "could harm the building in the long run". Along with the evidence that between 20% and 43% of the homeowners desired full disclosure on service charges setting, the data disputes the assumption that self-governance can address

governance issues in Tanzania. The lack of full disclosure can lead to poor accountability or influence a few homeowners to participate in the 'greater collective good' and become complicit in arrangements that stifle participatory democracy (Low et al., 2012). As a consequence, the system fails (Hess & Ostrom, 2007). Thus, for the long-term growth and success of self-governance, the governing institutions need to establish rules and maintain effective communication with their users.

Figure 2: Shortcomings of the Current Monitoring System



Author's calculations using survey data

A few respondents emphasised certain problems. For example, a lack of experience and knowledge required to self-govern was noted as a marker of poor governance. In support of this view, one board member said: "*The qualification of chairperson can be problematic, causing a lot of disputes inside the associations".However*, most members of the House management committee regarded this problem as emanating from discrepancies in the legal design. That is, self-governance institutions are unable to attract appropriate skills because the election board members are limited to owners of the property (see: UTA, 2008, S35 & 47).

Across the continent, legislation and administrative procedures necessary for condominium self-governance are still to be developed. In Ethiopia, provisions that deal with the structure and operation of the house management committee that is responsible for performing management functions for homeowners lacked clarity in operationalising it (Adam, 2012). The study noted the impreciseness of these provisions renders the condominiums vulnerable and subject to deleterious and counterproductive behaviours. A unique feature in South Africa is the institution relying on homeowners with the capacity and right technical expertise to be committed members of its house management committee (Baboolal-Frank, 2020). Furthermore, Griffin (1992) concurred that property managers must have experience in different areas.

Overall, it appears that a legislative framework that lacks clear delineations for a house management committee operates at the expense of good governance. Management services that

have poor regulations contradict the design principles of effective self-governance. The next section shows relatively weak enforcement of rules on self-governance. It challenges the assumption that collective action can solve management issues for condominiums in Sub-Saharan Africa.

5.2.2 Enforcement Mechanisms in Place Facilitate Free-riding

The design principles define effective governance as the ability to enforce rules consistently to all users of common property. This aspect considers the level of satisfaction on characteristics of the enforcement, potential inefficiencies, and how their rights can be exercised.

Overall, the research found that a majority (75%) of homeowners were satisfied with the systems and methods proposed to sanction offenders, but less satisfied with the enforcement aspect. The lack of homeowners participation was found by a large portion (57%) to be one of the problem areas. Between 27% and 50% of the homeowners indicated measures taken against defaulters and free-riders were relatively weak and did not take into consideration the severity of the problem (Table 3). The self-governance regime needs to respond appropriately when counterproductive and deleterious behaviours are detected. Weak enforcement can negatively affect the integrity of a self-governing institution and deter other functions of the property at risk. For this reason, it is important to develop an effective enforcement policy for the institution to take immediate and firm action on defaults.

The data also showed that another unique challenge faced by condominiums is a lack of clear delineation on the right to manage and decide on the ongoing management for renters in the legislative framework. This concern was voiced by one interviewee as follows:

> Apart from their growing prevalence, renters are neither involved in the making nor enforcing house by-laws. The self-governance may work at the cost of growing inefficiencies.

What the evidence infers is that renters are the real users of common property. Moreover, the decision on the right to manage is administered – regulated and enforced – at lower levels. Treating "use interest" in different and inferior ways continues at the expense of good governance.

In light of these outcomes, respondents were asked questions on how the enforcement mechanisms were affecting their motivation and actions. Most of the respondents (75%) felt that the core problems associated with opportunistic and free-riding behaviours of homeowners derived from the weak enforcement of rules governing day-to-day activities and collective action itself. The free-riding problem includes an array of disputes between parties from non-payment of house management fees to exclusive use area disputes. As a result, the issue of apathetic homeowners remaining unresolved has meant that an improved commitment to monitoring, creating mechanisms and developing clear decisions on this issue persist as essential ingredients for improving condominium management in Dar es Salaam.

Table 3: Satisfaction on Measures Taken against Defaulters

Respondents	Satisfaction with measures taken against defaulters and free-riders		
	Satisfied	**Less satisfied**	**Unsatisfied**
High-Rise buildings	22.40%	50%	27.60%
Row housings	23.70%	49.20%	27.10%
Total mean	**22.80%**	**49.70%**	**27.50%**

Source: Author's calculations based on survey data

5.2.3 Lack of Adequate Dispute Resolution Mechanisms

The survey was able to validate Ostrom's characterisations of effective dispute resolution. An exemplar is the tendency of prioritising low-cost, local arenas (in-house tribunals) dispute resolution over a court-based system. Yet, several widely held beliefs about alternative dispute resolution mechanisms remain under scrutiny. For example, while it is widely believed that Alternative Dispute Resolution (ADR) is subject to short and guaranteed solutions this was not observed to be the case in Dar es Salaam. For most respondents, A DR is still problematic because mediation, arbitration or negotiation are not remedies that are binding or enforceable. For instance, imposing penalties against free riders is possible but less effective. Some respondents described the situation as follows:

> A seriously indebted homeowner cannot be expelled or its unit taken into possession.

Furthermore, many believed:

> When it comes to controlling non-payment, the associations are on their own as there is a lack of binding legislation to prevent it. In the UTA, it is there but there are no real sanctions.

The court system is often approached to deliberate on contentious issues (Section 65 of the UTA). However, the survey revealed that decisions to proceed to litigation can be difficult. It requires balancing the prospects of litigation becoming costly and lengthy. A respondent cemented this argument by saying:

> The court process requires much in terms of time and energy. It involves huge costs for hiring a lawyer. This can bring about unhealthy outcomes to the building in the long run.

Based on reasonable conjectures from the survey data, none of these three views seems likely to support the existence of effective ADR. First, self-organised HOAs have the power to come up with their own rules to guide their operations and business affairs, but such power is limited by external authority. Secondly, problems such as free-riding arise because of a lack of clarity in rights.

6. Discussion

This study has shown there are dilemmas associated with a self-governance system within the condominium-housing sector in Tanzania. One of the main findings is the lack of a functional collective choice arrangement. Diverging interests among homeowners affected poor enforcement of rules and absentee homeowners prevented the involvement of homeowners[ii] and functional self-governing beyond the lack of adequate information and renters participating in decision-making. In the Global North and Global South, it is common knowledge that a failure in collective action is linked to the lack of a functional self-governance system (Adam, 2012; Baboolal-Frank, 2020; Lehavi, 2015; Low et al., 2012). This research identified the governance issues, including authoritarian forms of governance and rule-making, and regulation of rampant conflict among stakeholders. Treffers and Lipert (2020) concluded that self-governing in the USA is just a myth borne out of legislative idealism. Service providers and experts are increasingly influencing governing arrangements, which results in a conflict of interest or counterproductive decisions (Lippert, 2019; Lippert & Steckle, 2016).

There is little doubt that the deeply rooted limit in renters' rights is a critical issue that undermines the success of self-governing and is not exclusive to Tanzania but is a concern for other countries too. Adam (2012) described a case of failure in condominium management in Bahir Dar City, Ethiopia because of the poor formulation of institutions (rules) governing various aspects of condominium management. The study noted rules governing condominium management valued homeowners and disenfranchised renters in making decisions on day-to-day activities and collective actions. The conflict between tenants and management encourages counterproductive and deleterious behaviours leading to enforcement costs increasing and and the system failing. Treffers and Lipert (2020) asserted the failure to account for varying interests in the legal framework on condominiums at the national level reinforces power imbalances between homeowners and other stakeholders. If the issues remain unresolved condominium housing will remain a space of low-level contention.

One of the key restrictions is the lack of capacities[iii] and experience among homeowners in management-related issues. This can be addressed by conducting capacity development courses and developing a framework for implementing housing management. South Africa and the USA designed specialist courses for house management committee members focused on corporate governance and property management in the condominium housing sector (Treffers & Lipert, 2020; Baboolal-Frank, 2020).

Consistent with Ostrom's (2000; 1990) arguments, the failure to get monitoring and sanctioning mechanisms right is another domain which impedes the process of self-governance. An undeveloped system allows for counterproductive and opportunistic values such as free-riding[iv] to progress. This is despite the legal design and policy reforms providing incentives, procedures and mechanisms that permit effective monitoring and imposing graduated sanctions on offenders. With this understanding, McKenzie (2011) and Chen and Webster (2005) posited that greater involvement can be achieved by fostering a participatory culture, which is a sense of community and homeowners' social capital.

7. Conclusion and Policy Recommendations

This study relied on the common-pool resource regime (CPR) theory and Ostrom's design principles to explore whether commonly held views about self-governance are borne out in practice and potential inefficiencies. There is no modeling of the data in this study instead there is a qualitative and descriptive analysis. From a theoretical perspective, the study investigated commonly held views about self-governance and democratic collective governance practices in Tanzania to align with Ostrom's theory. In turn, it contributed to a better understanding of whether condominium self-governing communities can effectively function to address house management issues to foster collective governance, monitoring and the enforcement of rules related to self-governance in emerging countries. This was examined using Tanzania as a case study and drawing on first-hand experiences of condominium homeowners.

Findings showed the discrepancy in beliefs about self-governing. A collective decision that describes self-governance is not achieved when there are diverging interests, conflicts or absentee homeowners. Nor does the monitoring or enforcement of rules governing condominium housing seem effective in maintaining community cohesion. It was found that deterring free-riding behaviours is not possible if there is poor communication, lack of experience and knowledge about condominium governance, limited renters' rights and weaknesses in the condominium legal framework. Even though, alternative dispute resolution mechanisms are used, they are less effective as mediation or negotiation are not binding or enforceable.

However, there are strategies to improve the functioning of self-governing communities in condominium housing. Firstly, involving renters to take part in self-governance will lead to efficiency and greater community cohesion. Secondly, there is a need to identify target areas for active management and formulate an appropriate strategy for monitoring and enforcing rules. An example includes preparing guidelines and standards on how condominiums can be effectively governed. Lastly, building a plausible dispute resolution model designed to enforce management fee payment and arbitration to reduce free-riding.

Though sufficiently in-depth and enlightening, there is no formal discussion in this study on the relationship between self-governing communities and property management agencies. It would be critical to examine whether conflicts of interest do arise in a contract between PMAs and HOAs and the dispute resolution processes required. Although, the Dar es Salaam condominium housing sector reflected the trend of model application it may not contain all the encompassing dynamics. Further work could be done by extending the analysis geographically to understand the procedure for collective action. Moreover, the limitations identified in this study do not weaken the significance of the findings.

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Declaration of competing interest

None.

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Endnotes:

[i] A perceived lack of control by unit owners over governance activities involving fee determination, regulation and property management. Though it is seemingly not a critical issue to the majority of issues that respective condominium owners find perplexing across countries. They reinforce the existing empirical findings (Wekerie et al., 1980; Yip & Forrest, 2002; Blandy et al., 2006) that power is distributed unequally and individuals have little power in this housing form. The situation helps explaining why some owners do not support self-governance and collectivist values. Likewise, Lippert and Treffers (2016) and Treffers and Lippert (2020) observed the lack of transparency and trust in decision-making were the reasons for passivity in self-governance. The evidence confirms previous international scholarly discussions in Europe, Asia and Australia (Atkinson et al., 2005; Yip & Forrest, 2002; Dupuis & Dixon, 2004; Cassidy & Guilding, 2007; Hsieh, 2009), who established that management and maintenance issues in the condominium common property are likely to drive misunderstandings between respective homeowners and their governing bodies or other stakeholders.

[ii] Poor participation in condominium collective action is not an issue limited to Sub-Saharan Africa. Results reported in other regions (Zlatar, 2015; Gruis et al., 2009) showed that homeowners poor participation in collective action is linked to a lack of information. In transition economy, participation is found to be challenged by the legacy of socialist-imposed collectivism that lead to a refusal to work together (Borisova et al., 2014; Pojani & Baar, 2016). Other scholars have shown that it is linked to a lack of social capital (Cirman et al., 2013), or the "technical civic competence" (Borisava et al., 2014).

[iii] The management system depicted shows the lack of education and experience required to fulfill self-governance duties. Prevailing literature (see: Treffers & Lipert, 2020; Lippert & Steckle, 2016) revealed similar governance problems in other jurisdictions.

[iv] This is apparent even in high income countries from the Global North. Free-riders and apathetic behaviours are linked with poor enforcement of house by-laws/rules and subsequently impose greater constraints on the success of a collective action (McKenzie, 2011; Walks, 2010; Lippert, 2019).

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Enhancing Accuracy and Consistency in the Valuation of Plant and Equipment through Cubic Regression Models of Physical Deterioration

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Abstract

The valuation of plant and equipment often involves valuers deducting physical, functional, and economic depreciation from replacement cost estimates. Accuracy and consistency problems have plagued these calculations in determining the amount of physical deterioration to deduct. This study attempted to develop cubic regression models to resolve these accuracy and consistency problems in one industrial sector (the basic metal, iron and steel and fabricated metal product sector) in the two main industrial cities of the western zone of Nigeria (Sango Ota and Agbara). Questionnaires were administered to senior operators of plant and equipment in this sector to draw information on the degree of physical deterioration of plant and equipment over their service lives, using expenditure on repairs as a proxy for physical deterioration. The questionnaire sought information on the service lives of plant and equipment, the movement of the transition of physical depreciation over the service lives, and the degree to which various operational factors influence the movement of the transition. Data were analysed using mean, standard deviation, multiple linear regression, and cubic regression to produce what could be the first potentially accurate and consistent valuation model of physical deterioration in Africa. The service lives of various plants and equipment in selected sectors were found to range at various time points between 8 and 60 years. Cubic regression analyses showed that the pattern of the movement of expenditures on repairs (a proxy for physical deterioration) over the useful life of plants and equipment was not linear but cubic and generally followed S-shaped patterns. Multiple regression analyses showed that the S-shaped patterns were in turn influenced by operational factors (such as intensity of use

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and power outages). The study concluded that valuers' interests in accuracy and consistency in plant and equipment valuation were not served by any of the accounting methods hitherto used by valuers; accuracy in physical deterioration modelling follows an S-shaped transition over time. This S-shape is exuberated where there is inappropriate operational use of the plant and equipment.

Keywords: *plant and equipment, physical deterioration, service lives, pattern of physical deterioration*

1. Introduction

Professional services of an Estate Surveyor and Valuer are often required to determine the value of plant and equipment assets. Theoretically, in carrying out this valuation task, the five valuation methods (comparison, investment, replacement cost, profits, and residual methods) can be adopted. However, plant and equipment assets are often specialised assets. Specialised assets are 'property that is rarely, if ever, sold in the market, except by way of sale of the business or entity of which it is part, due to the uniqueness arising from its specialised nature and design, its configuration, size, location, or otherwise' (Royal Institute of Chartered Surveyors, 2005 3.2 p. 5; Plimmer and Sayce, 2006). The specialised nature of plant and equipment assets implies that the method of valuation that is most appropriate is Depreciated Replacement Cost (DRC). (International Valuation Standards, 2017). Depreciated Replacement Cost (DRC) is 'the current cost of reproduction or replacement of an asset less deductions for physical deterioration and all relevant forms of obsolescence and optimisation' (Ogunba, 2013 p. 73).

Depreciation, from the viewpoint of valuation standards, means a loss of value in a property/asset due to three types of deterioration: physical deterioration, economic obsolescence, and functional obsolescence. Physical deterioration is a situation where an asset (building or plant and equipment) suffers a reduction in value due to age, wear, and tear. Functional obsolescence in plant and equipment valuation is a loss in value of an asset caused by advances in technology that result in cheaper and more efficient plant and equipment assets than the one being valued. Economic obsolescence is a loss in value of an asset resulting from changed economic conditions that reduce the capacity utilisation of the asset being valued (Ogunba, 2013). A typical plant and equipment valuation involves the valuer determining the replacement cost of the plant and equipment asset, and then making deductions for physical deterioration, functional obsolescence, and economic obsolescence.

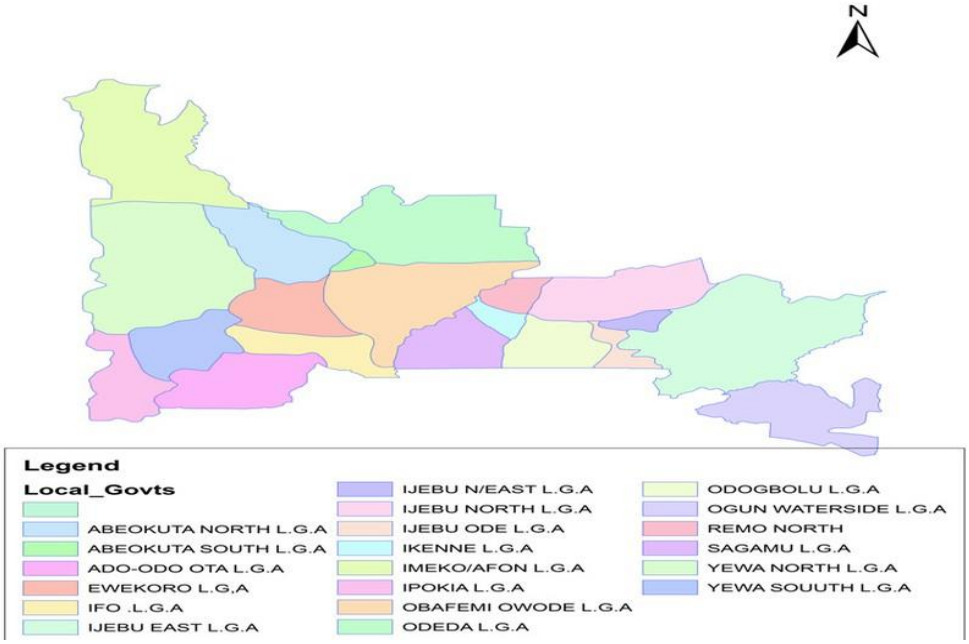
Experience has shown that the inaccuracy problem that usually occurs in plant and equipment valuation is not with the determination of replacement cost but with the quantum of deductions for physical deterioration, functional obsolescence, and economic obsolescence. Valuation is often viewed as both an art and a science. It is an art to the extent that it requires the use of a valuer's skill, judgement, and experience. However, it is also a science because it requires the valuer to use scientific modelling of the behaviour of property market participants in determining the values they would place on buildings, plants, and equipment. One implication of being an art is that valuations might never be exactly consistent (in terms of the valuations of different valuers tallying) or accurate (in terms of valuations being a true reflection of price or worthwhileness). Even where valuers have access to the same replacement cost data and operate contemporaneously,

the use of judgement to determine the quantum of depreciation or using judgement to select from different models purporting to estimate the quantum of depreciation (where each model has different assumptions) would result in inaccuracy and inconstancy. Appraisers in the United States do not face the problem of accurate or consistent determination of functional and economic obsolescence, because the determination of functional and economic obsolescence has been scientifically modelled and documented in their standard textbook - 'the Appraisal of Real Estate' (Ogunniyi and Ogunba, 2019). Valuers in other parts of the world may consider adopting or modifying such models without seeking to, as it were, 'reinvent the wheel'.

One is not aware of any standard models for the valuation of the physical deterioration (wear and tear of assets) aspect of depreciation even in the United States. Rather, it appears that across the world, a variety of models have been put forward (and are in use) on how to measure the physical deterioration of assets. These include estimated percentage depreciation (Shapiro, Mackmin, and Sams, 2012), and several models borrowed from the field of financial accounting including accelerated methods such as the sum of the year's digit and reducing balance; the straight-line method; and the decelerated methods such as the sinking fund model. However, these financial accounting depreciation models have divergent assumptions about how physical deterioration is patterned over the service life of an asset. For instance, as Ogunba (2013) states, the straight-line depreciation model writes off the value of an asset at a constant rate throughout the useful life of the asset, while the reducing balance and sum of year's digit depreciation models assume higher depreciation at the early stage of the service life of an asset and a decreased depreciation at the later service life of the asset. The sinking fund depreciation model assumes a higher depreciation in the later years of an asset. On the other hand, the estimated percentage depreciation method (which is in popular use in African countries like Nigeria and Ghana) is not based on any definable assumptions or scientific modelling but relies on the valuer's skill, experience, and judgement. The accuracy of all these models in terms of reflecting the pattern of wear and tear of plant and equipment assets over service life is questionable (Aluko, 2007).

The pursuit of accuracy and consistency requires that valuation moves more in the direction of science than in the direction of art. Science requires the valuer to use scientific modelling of the behaviour of property market participants in determining the values they would place on assets. This study seeks to enhance accuracy and consistency in the valuation of plant and equipment through the development of polynomial regression models of physical deterioration.

Figure 1: Industrial Zones in Ogun State, Nigeria



Researchers use Nigeria to study how an African country can develop models to enhance its valuation practice. The locational scope of the study is the western industrial zone of Nigeria, and the subject scope is plant and equipment in the basic metal, iron steel, and fabricated metal product sectors. The paper is structured into six sections. The first section introduces the paper, outlining the problem and the aim of the paper. The second section provides a review of relevant literature. In the third section, a methodology is provided, while the results and discussion are the focus of the fourth section. The fifth section demonstrates the usage of the models developed, while the sixth concludes the paper and provides recommendations.

2. Review of Literature

The review of literature is focused on selected empirical papers that have examined depreciation patterns of plant and machinery over their service lives and related assets like buildings. This is due to the dearth of studies in this area.

Evidently, an assessment of previous studies on service life and the pattern of physical deterioration is paramount. In this regard, there have been few studies that examined the service lives of assets. For example, Sahu, Narang, Sahu & Sahu (2016) estimated the economic life of machines for use in the depreciation-replacement model and presented a straight-line depreciation method which could be used to determine the economic life of productive plant and equipment. However, given several studies which suggest that an S-shape pattern is more typical of asset depreciation, a straight-line model might not accurately represent the movement of the pattern of wear and tear over useful life. Moreover, the studies did not consider the influence of operational

factors on the service life of plant and equipment. Koumanakoos and Hwang (1988) examined the forms and rate of economic depreciation of selected assets in the manufacturing and non-manufacturing sectors in Canada using the Hulten and Wykoff Box-Cox depreciation model. The researchers found that most assets have convex depreciation functions. The price-age behaviour of some assets was found to be volatile. Manufacturing industries had convex depreciation functions close to the geometric form for both buildings and plant and equipment with only a few exceptions. In non-manufacturing industries also, depreciation functions were of the convex geometric form, but with a less pronounced convexity in building construction than in plant and equipment. However, these findings were different from Sahu et al. (2016).

Related studies focused on the depreciation models adopted by valuers when valuing assets. Such studies include Wu and Perry (2004). The authors estimated farm equipment depreciation to ascertain which functional form is best for forecasting equipment depreciation. Observations were gathered from 16 years of auction sales (1984 to 1999) for 17 types of equipment, including tractors, combines, corn headers, balers, cotton harvesters, forage harvesters, mower-conditioners, mower-cutters, swathes, discs, ploughs, drills, planters, manure spreaders, skid steer loaders, and pickup trucks. According to the authors, the Box-Cox functional form allows for flexible changes in depreciation rates, which can be either positive, negative, or both. The changes were sometimes linear and sometimes decelerated in conformity with the Sum of the Years Digits. Plimmer and Sayce (2006) examined the methodology adopted by UK valuers when using the depreciated replacement cost (DRC) method in the valuation of building assets, with a view to creating a more consistent method for valuers to adopt. It was noted that DRC valuations were based on a variety of depreciation methods, resulting in a yearly variation in valuation estimates. The paper indicated that yearly variation should be the result of market-based factors rather than variation in the methods of valuing depreciation. The study also suggested that valuers require some form of guidance to ensure consistency in valuation output. However, the study was focused on buildings, not on plant and equipment.

A group of studies (Ogunba 2011; Bello 2014; Bello, Ogunba and Adegunle 2015; Ogunniyi and Ogunba, 2019) examined the choice of depreciation model valuers adopt in DRC valuation for buildings, perceptions of valuers on the accuracy and consistency of depreciation measurement, and the appropriateness of the depreciation approaches used by valuers in the depreciated replacement cost method of valuation of buildings. The authors found that cross-sectional models, breakdown models, and the S-curve model were the most rated depreciation models suitable for depreciation measurement. The use of depreciation measurement showed significant inaccuracy and inconsistency, particularly regarding estimated percentage depreciation. These studies found that an S-shaped pattern was the most accurate for estimating physical deterioration of buildings. However, instead of using this pattern, an estimated depreciation valuation, which was found to be inaccurate, inconsistent, and unable to differentiate between depreciation components, was predominantly applied. However, these studies were on buildings and not plant and equipment. Ogunniyi and Ogunba (2019) attempted to model plant and machinery in Osogbo, a state capital in Nigeria. They sampled machine operators in Osogbo to determine the physical deterioration trends of plant and equipment. These trends were then developed into physical deterioration models using log transformations. However, their study was focused on manufacturing companies in Osogbo, which is not an industrial city, meaning that only small-scale manufacturing companies could be sampled. Moreover, the use of log transformation regressions produced straight-line

regression equations that did not reflect the wear and tear patterns suggested in their scatter diagrams. Moreover, the influence of operational factors on the physical deterioration models produced was not included in the analysis, which could lead to underestimations of the quantum of deterioration.

Overall, five gaps were discovered in the review of the literature. First, some of the papers focused on the use of DRC to value buildings rather than plant and machinery. For valuation purposes, it is unlikely that the pattern of physical deterioration (wear and tear) observable for buildings is necessarily the same as the pattern for plant and machinery. Second, some papers did not focus on the situation in African countries. It is necessary for research to have a separate look at the situation in Africa, where the wear and tear pattern might be exuberated by harsher operational factors. The third gap is that some papers stopped at criticising the accuracy and consistency of depreciation models in popular use but did not embark on model development. Fourth, the few papers that looked at model development used linear regression or log transformations. Linear regression and log transformations are linear approximations of scatter diagram patterns which inadvertently obscure the patterns of wear and tear. What is required is the modelling of non-linear regression relationships (polynomial regression model). This would better capture the actual pattern of wear and tear on plant and equipment. Fifth, papers that developed models of physical depreciation did not consider the influence of operational factors on the models they developed. For example, if the same type of plant is purchased for use in the United States and another in Nigeria, each one may encounter distinct operational conditions, such as frequency of power outages and frequency of maintenance. Consequently, they may experience varying degrees of physical deterioration (wear and tear). Therefore, the influence of operational factors should be included in modelling for greater accuracy.

3. Methodology

The use of plant and equipment in Sango Ota and Agbara (two of Nigeria's foremost industrial towns located in Nigeria's western industrial zone state) is used as a case study to demonstrate how physical deterioration modelling can enhance accuracy and consistency. The study focused on plant and equipment in the basic metal, iron and steel and fabricated metal product sectors. Discussions with officials of the Manufacturers Association of Nigeria (MAN) and reference to the association's directory (MAN, 2019) showed that there are thirty-seven manufacturing companies registered under the basic metal sector in Ogun State, Nigeria.

The intent of the study was to measure the pattern of physical deterioration (pattern of wear and tear) for each plant and equipment in this sector every two years until the end of their respective useful lives. The study adopted a quantitative (cross-sectional survey) design to model the path or movement of expenditure on wear and tear over plant and equipment service life rather than a longitudinal design. This is because an earlier study (Ogunba, 2011) had shown that a longitudinal survey would be impracticable for a study of this nature; it would have to span the entire service life of each plant and equipment. The study population appropriate for providing information on wear and tear costs were the most senior operators of the plants and machines in the thirty-seven companies. Questionnaires were accordingly self-administered on a cross-section of senior (most experienced) plant and equipment operators in the employ of manufacturing companies in the metal sector of the two most industrialised cities of the western industrial zone of Nigeria. The

findings were analysed using polynomial (cubic) regression rather than linear regression so as not to obscure the accurate pattern of wear and tear.

The measurement of wear and tear was operationalised by measuring the yearly expenditure on repairs and maintenance for each plant/equipment captured every two years over the plant/equipment's service life. A pilot survey conducted in October 2021 indicated that there are nine types of plants and twenty-five types of equipment (machines) common to companies in this sectoral group. The measurement of wear and tear costs was done for each of these items of plant and equipment.

The procedure was to first inquire into the plant and equipment that are common to the thirty-seven manufacturing companies in the industrial sector and ascertain the service life of each item of plant and equipment for the purpose of determining the average service life. Next, the study investigated the pattern of physical deterioration over useful life, operationalised by measuring yearly expenditure at two-year intervals. The next step was to investigate operational factors that could increase or decrease the pattern of expenditure on repairs and maintenance. Finally, the study demonstrated the use of the model for readers of the paper and for plant and equipment valuers. The method of physical deterioration considered to be most appropriate for modelling non-linear regression relationships is polynomial regression. The alternative approach sometimes used for non-linear regression, namely log transformations, as used by Ogunniyi and Ogunba (2019), was discounted because it produces a linear relationship. Polynomial regression finds an equation that produces a curved line that closely fits the scatter plot lines. The curved lines are produced using an equation where the independent variables are raised to powers such as X^2 and X^3, depending on the number of inflections (bends). Where there is one bend in the regression line, a squared term (that is, a polynomial of degree two) is added to the independent variables. The polynomial regression equation is described as quadratic and takes the form.

$$Y = a + b_1X_1 + \ldots + b_2X^2 \quad \ldots\ldots (1)$$

Where there are two bends in the line, the polynomial regression equation is described as cubic and takes the form:

$$Y = a + b_1X_1 + \ldots + b_4X^4 \quad \ldots\ldots (2)$$

The R^2 results in the regression equation show the degree to which the independent variables explain the variation in the dependent variable. The p values show the degree of reliability of the alpha and beta coefficients. Generally, where p values are below 0.05, the results could be considered reliable, whereas when the p values are above 0.05, the results would have to be interpreted with caution.

4. Results and Discussion

The questionnaire was self-administered to senior operators in the basic metal, iron and steel, and fabricated metal product sectors in the two cities of Sango-Ota and Agbara in the last months (October to December) of 2021. The responses were analysed in the months of February and March 2022 using SPSS software.

As earlier stated, at the first level of inquiry, the study identified the plant and equipment that are common to the thirty-seven manufacturing companies in the industrial sector and investigated their respective mean service lives. The findings are documented in Table 1.

Table 1: Service Lives of Plant & Equipment in Basic Metal, Iron and Steel and Fabricated Metal Product Sectoral Group

Plant	Mean of Service life	Standard deviation of service lives	Equipment	Mean of Service life	Standard deviation of service lives
Steel rolling/ Rolling mill plant	20	0	Straightening machine	15	5.77
Cutting plant	10	0	Blowers	60	0
Aida plant	10	0	Welding machine	23	1.73
Tube mill plant	10	0	Boiler	22	4.04
Water circulation/treatment Plant.	8	0	Compressor	28	11.5
Aluminium coil plant	13	1	Water circulation	36	5.29
			Corrugating machine	40	0
			Embossing machine	36	0
			Lathe Machine	45	0
			Crown making machine	20	0
			Industrial drilling machine	35	0
			Overhead crane/Fork lift	27	0
			Uncoilers	40	0
			Line motors, gear box, drivers	60	0
			Grinding machine	60	0
			Hydraulic machine	29	0
			Hard Diamond / Cutting machine	10	0
			Reversible cold rolling mill	30	0
			Reversible hot rolling mill	34	0
			Billet and slab casting machine	60	0
			Continuous casting machine	60	0
			Stagger blanking machine	60	0
			Melting and holding furnace	35	0
			Slitting line	60	0

	Flat line	60	0

Source: Field survey, 2021

From the data gathered, it was observed that the estimated service life of plants such as steel rolling/rolling mill plants, steel rolling/rolling mill plants, cutting aida and tube mill plants, aluminium coil plant and water circulation/treatment plant in the basic metal sector ranged from 8 to 20 years (standard deviations of 0 to 1), with the most typical service life (being 10 years standard deviations of 0). The mean service lives of equipment ranged from 15 to 60 years (standard deviations of 0 to 11.5 years), with the most typical service life being 60 years with standard a deviation of 0. These results largely conform with the service lives found in the study of Ogunniyi and Ogunba (2019).

Having identified the common plant and equipment and determined the service lives, the next level of inquiry was to investigate the pattern of physical deterioration of each item of plant and equipment over the service life. This was achieved by asking the senior operators in the thirty-seven companies to indicate their annual expenditure on repairs and maintenance of each plant/equipment every two years until the end of their service life. The data obtained were averaged and based on observation of scatter diagrams, model development was based on polynomials rather than linear or log regression. The results are depicted in Figures 2 to 28.

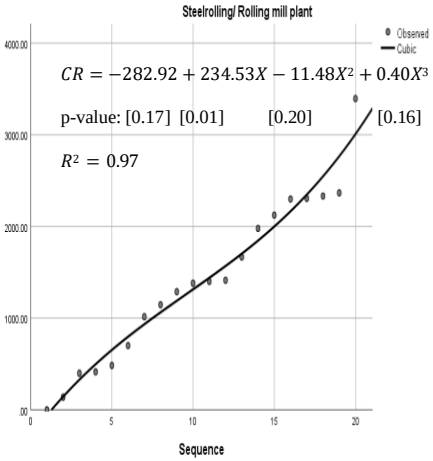


Figure 2: Physical Deterioration of Steel rolling/ Rolling mill plant

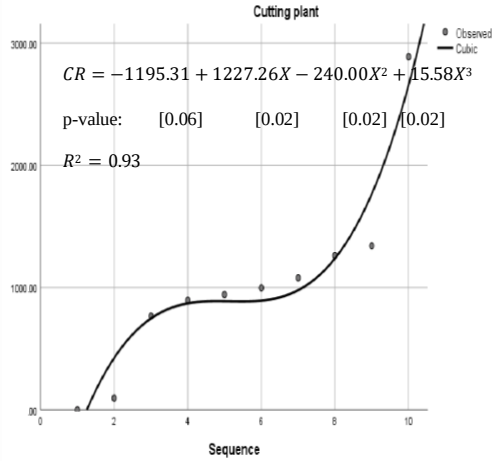


Figure 3: Physical Deterioration of Cutting plant

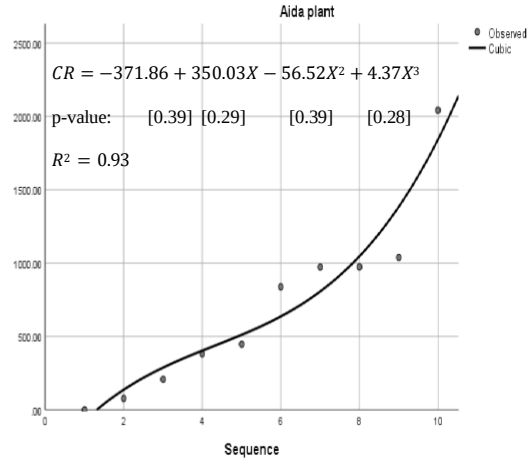


Figure 4: Physical Deterioration of Aida plant

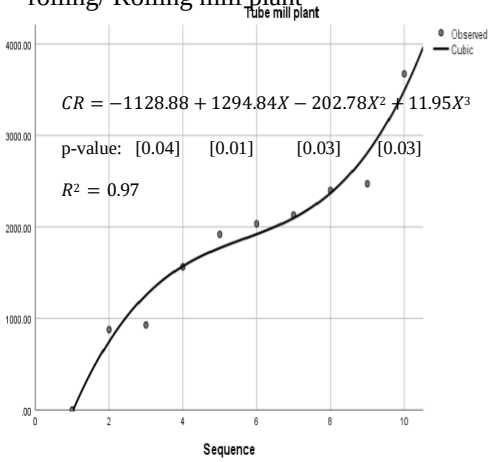


Figure 5: Physical Deterioration of Tube mill plant

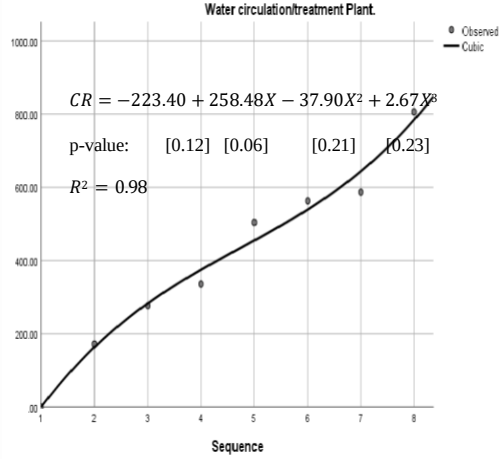


Figure 6: Physical Deterioration of Water circulation/treatment plant

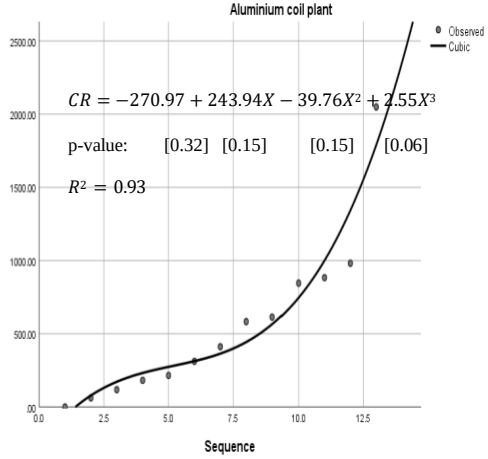


Figure 7: Physical Deterioration of Aluminium coil plant

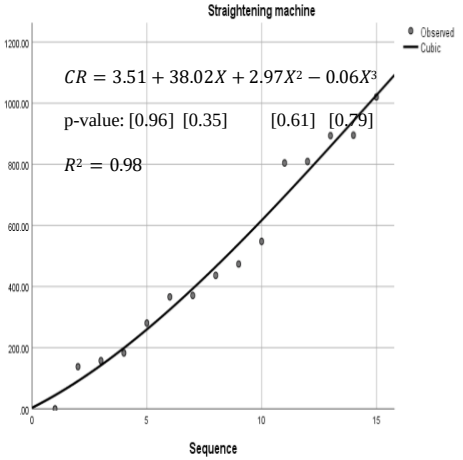


Figure 8: Physical Deterioration of Straightening machine

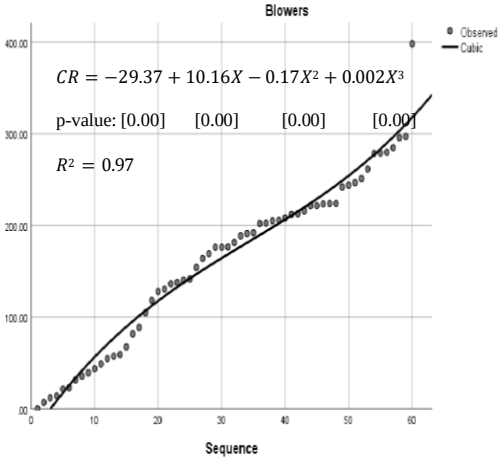


Figure 9: Physical Deterioration of Blowers

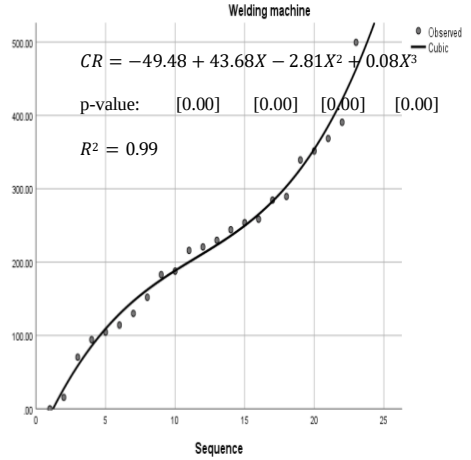


Figure 10: Physical Deterioration of Welding machine

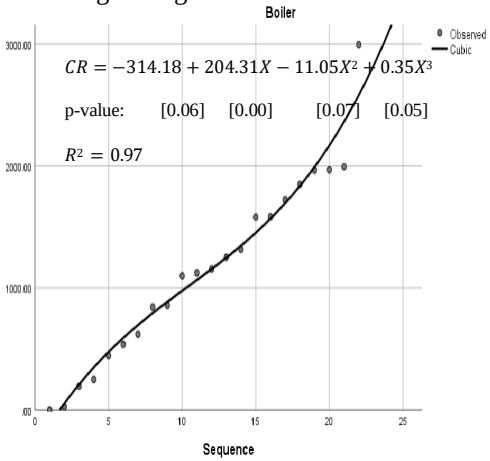


Figure 11: Physical Deterioration of Boiler

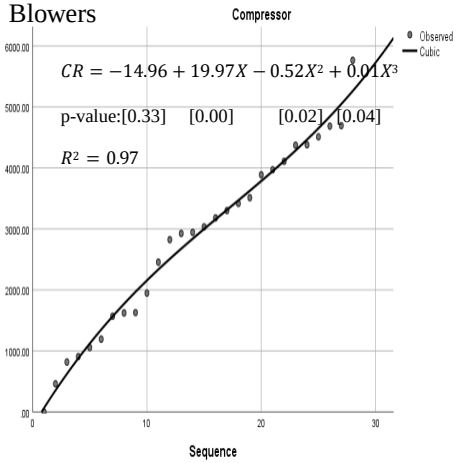


Figure 12: Physical Deterioration of Compressor

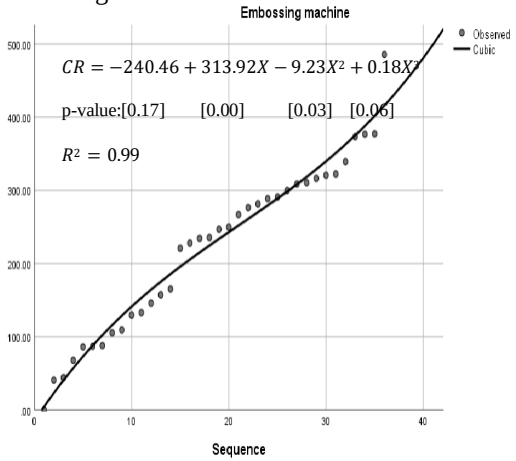


Figure 13: Physical Deterioration of Embossing machine

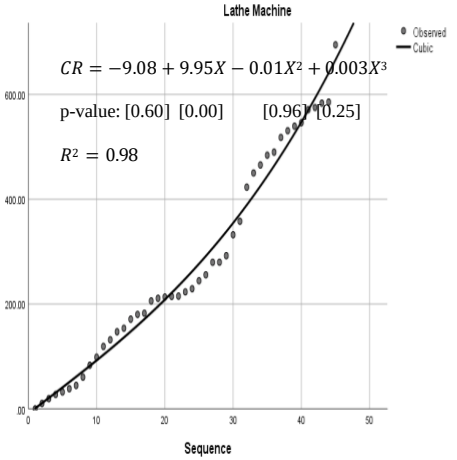


Figure 14: Physical Deterioration of Lathe Machine

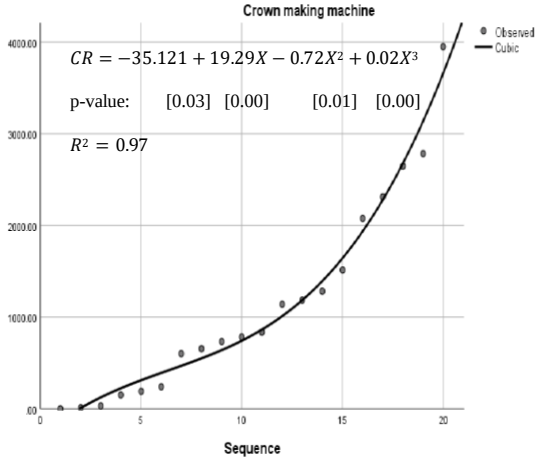


Figure 15: Physical Deterioration of Crown making machine

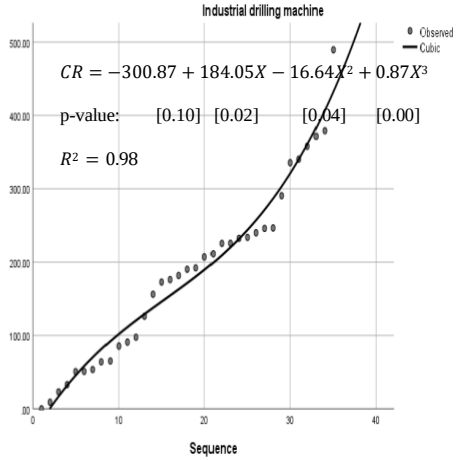


Figure 16: Physical Deterioration of Industrial drilling machine

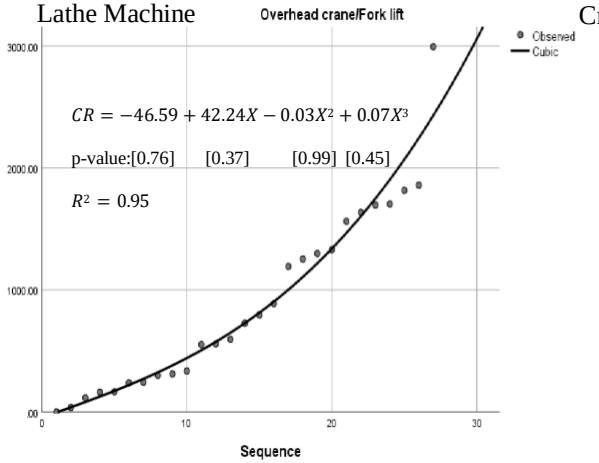


Figure 17: Physical Deterioration of Overhead crane/Fork lift

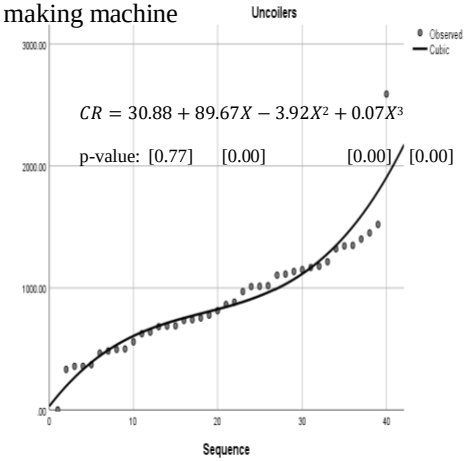


Figure 18: Physical Deterioration of Uncoilers

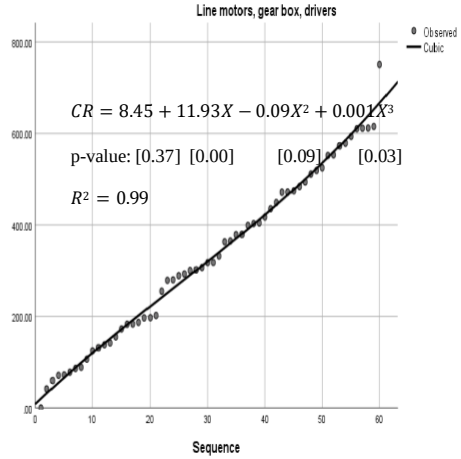


Figure 19: Physical Deterioration of Line motors, gear box, drivers

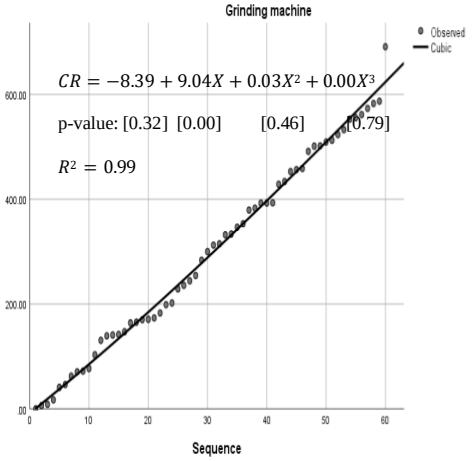


Figure 20: Physical Deterioration of Grinding machine

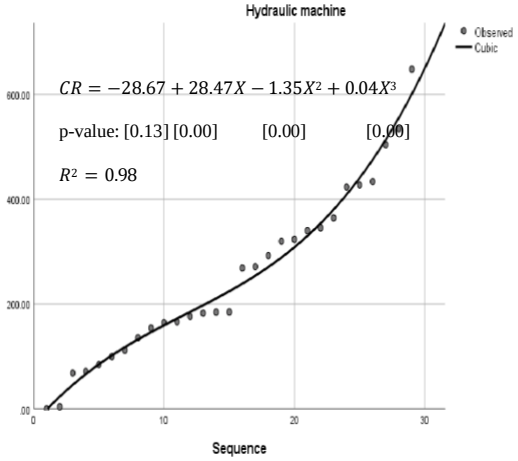


Figure 21: Physical Deterioration of Hydraulic machine

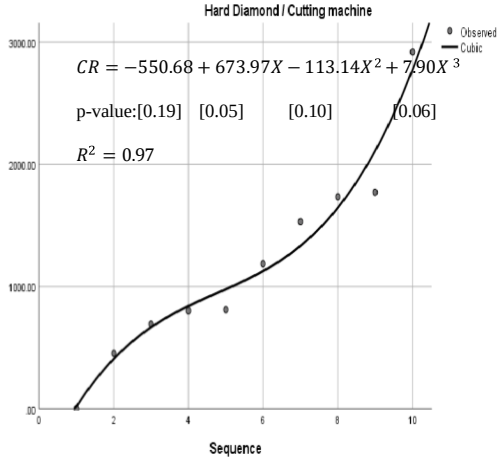


Figure 22: Physical Deterioration of Hard Diamond / Cutting machine

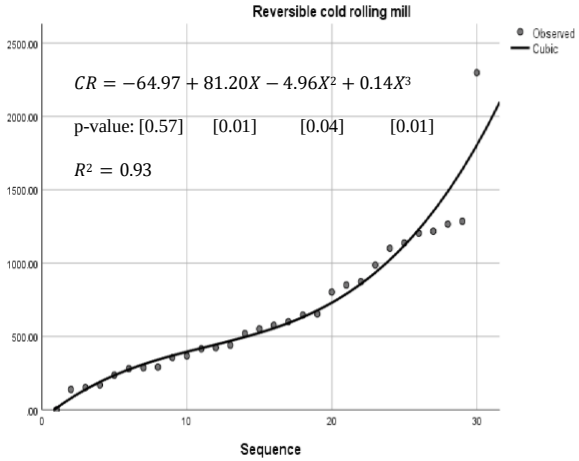


Figure 23: Physical Deterioration of Reversible cold rolling mill

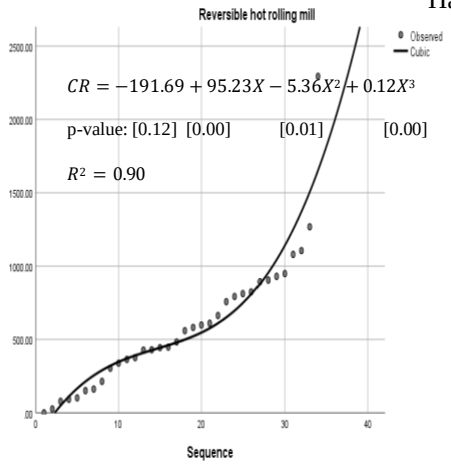


Figure 24: Physical Deterioration of Reversible hot rolling mill

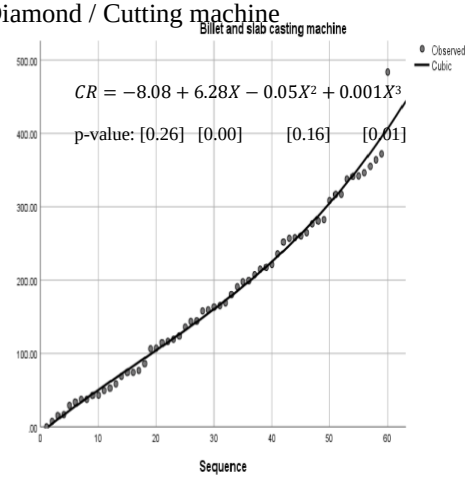


Figure 25: Physical Deterioration of Billet and slab casting machine

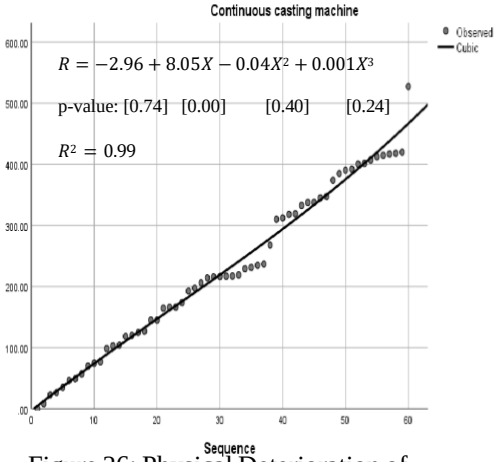


Figure 26: Physical Deterioration of Continuous casting machine

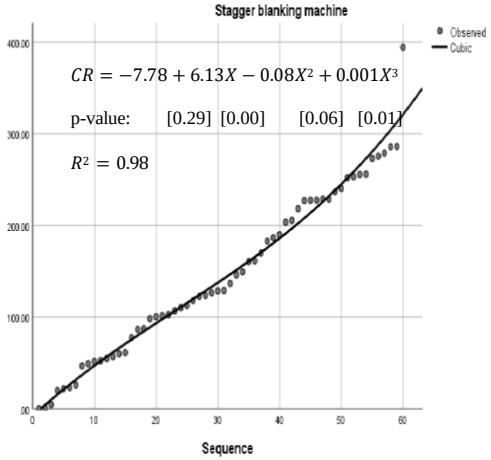


Figure 27: Physical Deterioration of Stagger blanking machine

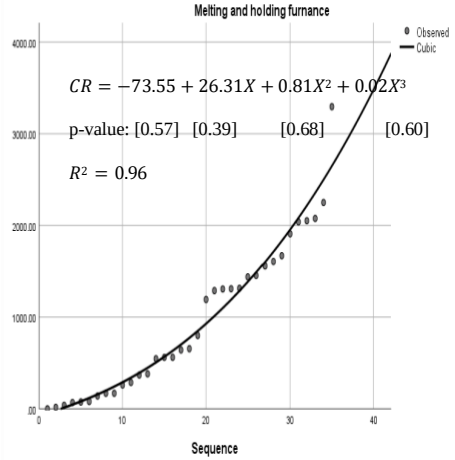


Figure 28: Physical Deterioration of Melting and holding furnace

The regression equations produced from scatter diagrams are somewhat S-shaped, typically having two bends. The regression equations were therefore cubic in form.

$$CR = a + b_1X + b_2X^2 + b_3X^3 \quad \text{(3)}$$

The R^2 results showed the degree to which the independent variable (time) explains the variation in the dependent variable (cost of repairs). In the physical depreciation models of the plant and equipment (Figures 2 to 28), most R^2 results were above 90 percent. This indicates that a significant amount of the variation in the cost of repairs may be attributed to the passage of time until the end of the service life. The p-values showed the degree of reliability of the alpha and beta coefficients. Generally, most of the p-values were below 0.05, meaning most of the results are considered reliable. In the few cases where the p-values were above 0.05, the modelling results would have to be interpreted with caution.

Typically, the first one or two years of the S-shape patterns showed zero cost of repair. This is reasonable because brand new plant and equipment would incur minimal or no cost of repair, except where there is a factory fault. Plant and equipment, just like cars, do not develop faults in the first few years (say, 0 to 4 years). The patterns then show an upward swing (the first bend) from about the 2nd to the 4th year when costs of repairs and maintenance begin to increase, indicating an upswing in wear and tear. Between the 4th and 6th years, the increase in the cost of repairs stabilises, increasing at a decreasing rate before finally upswinging again. This was the case with most plants and equipment across the basic metal sectors.

This S-shape pattern of physical deterioration agrees with the pattern in a related study of physical depreciation on buildings by Bello, Ogunba and Adegunle (2015), which also showed an S-shape pattern. It is also in agreement with the scatter diagrams in the study of Ogunniyi and Ogunba (2019), that there have been very few studies conducted on the pattern of physical deterioration of plant and equipment.

The study's third level of inquiry was to model the influence of operational factors on the pattern of physical depreciation. Respondents (plant and equipment operators) were presented with various factors potentially influencing the pattern of physical deterioration (that is, level of maintenance, intensity of use of the plant and equipment, workload imposed on the plant and equipment, availability of spare parts, occurrence of power outages, and overly high electricity voltage). Respondents were presented with a five-point scale of scenarios of these factors (for example, scenarios ranging from overly high intensity of use of machines to scenarios of low intensity of use, and from very frequent maintenance of machines to very infrequent maintenance, etc.). Respondents (plant and equipment operators) indicated on a five-point scale how much the cost of repairs (wear and tear) would increase in each scenario. The conceptual expectation was that with higher workloads on the plant and equipment, higher intensity of use beyond recommended use, higher or very low electricity voltage, and frequent power outages, the result would be an increase in physical deterioration (represented in this study by the cost of repairs). Data obtained from this inquiry were averaged and modelled using multiple regression analysis. In the regression equation, the increase in the cost of repairs was the dependent variable, while the various factors causing the increase were the independent variables. The beta coefficient of each

independent variable showed the degree of influence each factor had in increasing the cost of repairs. The findings are presented in Tables 2 and 3, which pertain to plant and equipment, respectively.

Table 2: Regression Results on Increase in Cost of Repair of Plant as a Result of Operational Factors

Sector		Alpha	LM	IU	WL	AS	PO	EV		R^2
Basic metal, iron	**Beta**	-8.933	-1.574	4.554	9.077	-6.212	6.432	-3.238		0.96
and steel fabricated metal product	**Coefficient**									
	P-value	0.002	0.395	0.027	0.000	0.006	0.003	0.085	0.00	

Table 3: Regression Results on Increase in Cost of Repair of Equipment as a Result of Operational Factors

Sector		Alpha	LM	IU	WL	AS	PO	EV		R^2
Basic metal, iron	**Beta**	-8.933	-0.157	0.455	0.908	-0.621	0.643	-0.324		0.96
and steel fabricated metal product	**Coefficient**									
	P-value	0.002	0.395	0.027	0.000	0.006	0.003	0.085	0.00	

Source: Field survey 2021

Keys:
LM = level of maintenance
IU = Intensity of use
WL = Workload
AS = Availability of spare parts
PO = Power outage
EV = Electric voltage

Tables 2 and 3 present the regression beta coefficients of the relationship between operational factors and costs of repairs (physical deterioration). Where there are negative coefficients, this indicates that the higher the value of the independent variable on a five-point scale, the lower the value of the dependent variable. Positive coefficients indicate that the higher the value of the independent variable, the higher the cost of repairs. For example, where there is a very high intensity of use with a rating of 5 over 5 and the beta coefficient is 3.591, the increase in the cost of repairs would be 5 x 3.591 naira, which is 18 naira. Where the beta coefficient is negative, for example, -4.515 for the level of maintenance, and assuming a higher level of maintenance with a rating of 5 over 5, then the additional cost of repair would be -4.515 x 5, which is minus 23 naira (reducing the cost of repairs).

The R^2 result ($R^2 = 0.97$) indicates that a high (97%) level of variation in the dependent variable (cost of repairs) is explained by the independent variables. The p-value of the beta coefficients for QM, FM, SO, and CM are less than 0.05, meaning that these beta coefficients are reliable. The p-values of the beta coefficient for LM and RM are more than 0.05 but less than 0.10, meaning that the beta coefficients are only reliable at the 90 per cent confidence level and should be interpreted with caution.

Generally, the results are consistent with common sense. It makes sense to see that the higher the level of maintenance and availability of spare parts, the less the wear and tear (proxied by the cost of repairs). It also makes sense to find that the more the intensity of use and power outages, the more the wear and tear (cost of repairs).

5. Demonstration of the Use of the Modelling of Physical Deterioration

The paper will now proceed to demonstrate the use of the physical deterioration model developed. Ogunba (2011) had earlier pointed out that valuers tend to use the easiest models rather than more suitable ones. The authors are anxious to point out the usability of the model produced; potential users need not be put off by apparently complex models, which may appear to them to be another demonstration of academic wizardry.

For demonstration purposes, we may suppose a valuer is asked to value an industrial drilling machine in the basic metal sector (using DRC). We may assume further that the valuer has consulted with the manufacturer and ascertained that the replacement cost is 500,000 naira. Physical inspection and inquiries from the operators indicate that the machine has used four years of its service life.

The relevant valuation equation is:

Depreciated Replacement Cost = Replacement cost minus (physical deterioration + functional obsolescence + economic obsolescence)..... (4)

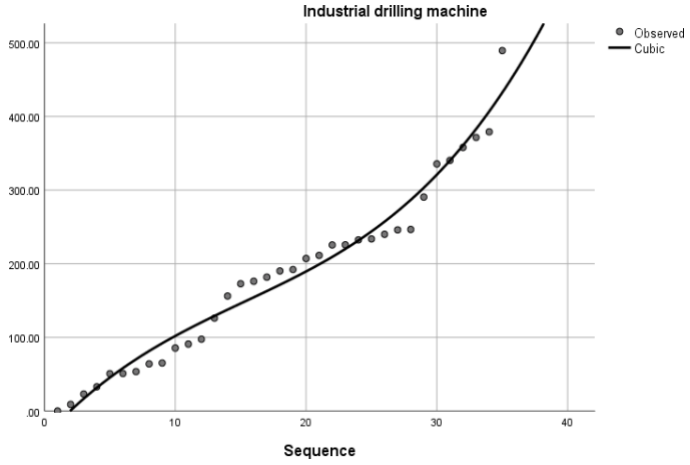
For simplicity, we may assume that the machine is neither functionally nor economically obsolete. The equation then becomes:

Depreciated Replacement Cost = N500,000 - (physical deterioration + 0 + 0).....(5)

In the model developed in this paper, physical deterioration is operationalised by the cost of repairs. The relevant cubic regression equation for physical depreciation is:

$$CR = -300.87 + 184.05x - 16.64x^2 + 0.87x^3 \quad \text{.....(6)}$$

where x is the number of years used out of the service life of 20 years (in this case, 4 years), alternatively, instead of using the formula, the amount of wear and tear (cost of repairs) can simply be read off from the regression line in Figure 15, as shown below.



Thus, given that the plant has used four years of its service life, the physical deterioration (represented by cost of repair) would be:

$$CR = -300.87 + 184.05x - 16.64x^2 + 0.87x^3 = N264.77 \quad \text{.....(7)}$$

However, this cost of repair is a generalised cost of repair that has not considered the influence of operational factors peculiar to the machinery being valued. The findings have shown that wear and tear (and cost of repairs) is influenced by levels of maintenance, intensity of use, workload, availability of spare parts, power outages, and electricity voltage peculiar to the usage of the P and M. The valuer using the model would rate each of these operational issues on a five-point scale, drawing from his or her inspection of the plant or equipment and discussions with the operators. In the regression equation, each factor's rating multiplies the corresponding beta coefficient.

In the model, the additional cost of repairs is represented by multiplying the ratings with the beta coefficients in the following equation:

$$\text{Additional costs of repair} = -8.93 - 1.57LM + 4.55IU + 9.08WL - 6.21AS + 6.43PO - 3.24EV \quad \text{... ... ... (8)}$$

In a worst-case scenario (that is, where the plant or equipment is found to be very badly used), the ratings would be as follows: the level of maintenance is extremely low (1 on a 5-point scale), the intensity of use of machine is very high (5 on a 5-point scale), workload on machine is very high (5 on a 5-point scale), the availability of spare parts is very low (1 on a 5 point scale), the power

outages are very frequent (5 on a 5-point scale), and the level of conformity of the electricity supply with voltage specifications (220 volts) is low (1 on a 5-point scale),
When these ratings are multiplied by the beta coefficients, the equation becomes:

$$\text{Additional costs of repair} = -8.93 - (1.57\ x\ 1) + (4.55\ x\ 5) + (9.08\ x\ 5) - (6.21\ x\ 5) + (6.43\ x\ 5) - (3.24\ x\ 1) = -8.93 - (1.57) + (22.75) + (45.4) - (31.05) + (22.15) - (3.24\ ) = 45.51 \text{ naira} \quad (9)$$

The physical deterioration of the crown-making machine in the basic metal sector that has been badly used for 4 years of its service life of 20 years is therefore:

$$(CR = -300.87 + 184.05X - 16.64X^2 + 0.87X^3) + (-8.93 - 1.57LM + 4.55IU + 9.08WL - 6.21AS + 6.43PO - 3.24EV) = \text{N}264.77 + 45.51 = \text{N}310.28 \quad (10)$$

The valuation is, therefore. concluded as follows:

$$\text{Depreciated Replacement cost} = \text{N}500{,}000 - (\text{N}310.28 + 0 + 0) = 499{,}689.72.51 \text{ naira} \quad (11)$$

6. Conclusion

The study started with a focus on the problem of inaccuracy and inconsistency in the valuation of plants and equipment which are often valued using the depreciated replacement cost method. The problem was narrowed down to inaccuracy and inconsistency in the determination of physical obsolescence, where valuers make use of varied methods such as estimated percentage depreciation or methods borrowed from the field of financial accounting. It was noted that financial accounting methods are based on different assumptions of the pattern that physical deterioration follows over service life, ranging from straight lines to convex or concave patterns.

The pursuit of accuracy and consistency requires that valuation move more in the direction of science than in the direction of art. Science requires the valuer to use scientific modelling of the behaviour of property market participants in determining the values they would place on assets. This study has developed a cubic regression model for physical deterioration by tracing the path of costs of repair experienced in the use of plants and equipment over their service life. This model can be combined with mathematical models for economic obsolescence and functional obsolescence already in use by the American Society of Appraisers to have a holistic coverage of the three components of depreciation when conducting plant and equipment valuation.

The paper, accordingly, recommends that in the use of DRC method of valuation, there should be a paradigm shift away from the use of depreciation models like estimated percentage depreciation (which is in popular use in African Commonwealth countries like Nigeria, Kenya, and Ghana), as this model is not based on any definable assumptions or scientific modelling. It is largely an art, relying on the valuer's skill, experience, and judgement. This method obviously cannot guarantee consistency and accuracy. There should also be a shift away from the use of financial accounting methods for estimating physical deterioration since the straight line, concave, and convex

depreciation patterns suggested by these accounting methods do not reflect the S-shaped path of costs of repair experienced by machine operators.

The study would also advise that valuers should not be put off by what looks like statistical complexity in the use of the cubic regression models; as has been demonstrated, the amount of wear and tear (cost of repairs) for an asset can simply be read off from the regression curve. There are, however, additional costs to be added after reading off the regression curve. The study has found that factors like poor maintenance, intensity of use, excess workload, non-availability of spare parts, power outages, and electric voltage fluctuations can increase the wear and tear (and cost of repairs) of plant and equipment.

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Real Estate Research Trends and Directions in Africa: Insights from the African Real Estate Society Conferences 2011-2022

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Abstract

This study explores the nature of research contributions to the African Real Estate Society (AfRES) conferences and establishes the emerging trends across African real estate markets. The study employed a desktop review of 500 abstracts published in the AfRES Conference proceedings from 2011-2022 to conduct a descriptive content analysis. The study finds that top research themes include Housing/Markets Analysis (19.32%); Finance/Investment (17.69%); Appraisal/Valuation (15.75%); Institutions (11.04%); and Policy issues (10.39%). Nigeria, Ghana, and South Africa were predominant when assessing research contributions according to country. Furthermore, the study finds that the practice of rotating the location of the annual conferences across regions is valuable for attracting diverse contributions across regional markets while also fostering inclusivity. The results show a significant preference for quantitative (43.20%) and qualitative (26.80%) analyses by authors. The study highlights research gaps that relevant stakeholders could consider in developing their research agenda for the continent. While this study has not explored the full complement of real estate research

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outlets on the African continent, its findings could help in understanding how the African market and its research directions compare with the real estate focus across other continents.

Keywords: *AfRES Conferences, Africa, emerging trends, real estate market, research trends*

1. Introduction

The field of real estate in Africa has shown considerable growth and transformation which has attracted larger local and international audiences. However, Rothenberger (2010) sadly notes that while real estate in Africa has witnessed higher returns than most other developing regions, it has only received minimal attention in terms of real estate research and foreign real estate investment activity. Therefore, there is a high-priority need to explore data-driven insights that can guide the next generation of market players as they navigate the highly competitive and expanding space.

While academia, and private and public sector stakeholders seek to develop the Real Estate markets across the continent, there is a need to address much of the unknown when it comes to prioritizing research activity and investment. This kind of study is also critical for consolidating emerging research activities and trends as a means for mapping out the direction of knowledge development in the sector. Thus, while real estate research is increasingly gaining momentum, the AfRES has neglected exploring the contributions of academic writings as a body of knowledge and additional source (Nguyen, et al., 2021; Ploessl et al., 2021; Breuer and Steininger, 2020). The African Real Estate Society has promoted networking, research, and education among property professionals across Africa and has hosted annual conferences since its formation in 1997.

These conferences, which are attended by both researchers and industry players, have contributed to African Real Estate knowledge and research through the publication of conference proceedings which include research insights across the continent. However, the nature of this body of knowledge, its impact and its relevance for African real estate market players is yet unknown. Considering how much resources are committed to hosting these conferences alongside the coordination of the research peer review and publication processes, it would be valuable to explore this data and identify the critical trends and opportunities that these research works provide.

Notably, the International Real Estate Business School (IREBS) Foundation for African Real Estate Research has provided grants, scholarships, and funding for real estate research across the continent since its inception in 2010. The activities of the IREBS Foundation for African Real Estate Research have in addition supported contributions by its professional members as well as by academic institutions to the AfRES Conferences These specific contributors can currently be organized into three regions. These are: (1) Southern Africa (Republic of South Africa, Botswana, Swaziland, Lesotho, Mozambique, Mauritius, Madagascar, Zambia, Angola and Namibia); (2) Eastern Africa (Tanzania, Kenya, Uganda, Rwanda, Burundi, Republic of Congo, Seychelles, Eritrea, Djibouti, Comoros, Ethiopia, Sudan and Somalia); (3) Western Africa (Nigeria, Ghana, Mauritania, Senegal, Mali, Guinea, Burkina Faso, Ivory Coast, Liberia, Sierra Leonne, Togo, Benin, Cameroon, Chad, Central Africa Republic, Congo Brazzaville, and Gabon).

AfRES is further affiliated with the global community through its relationships with 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). Yet, the few comprehensive studies that have explored the research trends within these networks, such as Roulac et al. (2004) and Adnan et al. (2011), do not include any research from AfRES or the African continent. Adewunmi and Olaleye (2011) do examine real estate research directions and priorities with a focus on Nigeria, but the authors use a different approach - examining practitioners' views and avoiding covering the entire African continent. There therefore appears to be only limited research in this regard since 2011. One such is the work of Afinowi et al. (2022) which only covers residential real estate research trends in the African continent since 2011. This emphasizes the significant need for a study which specifically maps research trends in Africa, and focuses particularly on outputs from the AfRES conferences which offers extensive African real estate research. It is critical to note that there is other literature which has explored real estate research trends by investigating the proceedings of conferences in Europe, the United States and Asia (Abatecola et al., 2013; Saiz, and Salazar, 2018; Breuer, and Steininger, 2020; e Just et al., 2021). In comparison, there has been little to no coverage of the research of trends within the AfRES conferences alongside that of the African continent in general (Simons et al., 2023). This creates a huge gap in information within ongoing research by professionals and academics in the continent. As a result, the knowledge of what research directions have been taken within the African real estate market becomes an interesting focus. Most markets on the African continent are predominantly emerging markets, except for South Africa which has the largest Real estate Investment Trust (REIT) sector in the continent, and there is therefore the need to understand the growing dynamism in real estate research, education, and practice (Okoro, 2023). In addition, understanding research direction could foster stronger linkages and collaborations across the continent with a view to ensuring that academic research is linked to industry – specifically when viewed through the perspective of industry-academic collaboration. An increased town-gown symbiosis could ensure a growing relevance of the African real estate market and ensure global competitiveness. Moreover, local, and international research funders are interested in understanding the research directions to justify research initiatives and allocate funds for research in the African real estate market.

Critical to this investigation is the need for real estate education, curricula, or knowledge in the continent to be aligned with local contexts. Kariuki et al. (2022) provide a strong argument when it comes to the extent of real estate education in Africa, including their assertions about the lack of a connection or relevance African real estate education has to the informal nature of the local markets. They also emphasize the need for institutions to adapt methods and practices from developed markets according to their unique contexts instead of developing curricula that lack practical content for each country's maturity level. Analyzing published AfRES conference proceedings can bridge this gap by providing research insights and trends that are relevant locally and in African real estate in general. These insights can help real estate educators keep their training for students relevant and cognizant of future research gaps that academics and students can further investigate.

This study investigates the real estate research trends and directions emerging from the proceedings of AfRES conferences between 2011 and 2022. To achieve this aim, the study answers the following questions:

1. What is the total research output and contributions by countries to the AfRES Conference?

2. What themes have received the most attention in AfRES conference proceedings?
3. What are the emerging continent-wide trends in AfRES Conference real estate research?
4. What research methods are mostly employed by authors at the AfRES Conference?

2. Literature Review

While there has been relatively sparse academic study of the research trends in African real estate, this literature review sheds light on some of the global studies that have attempted to map similar trends across the globe. The review employs a chronological approach to demonstrate the history and timeline of literature with the intention of assessing the historical scope of research that has given rise to the current study.

One of the earliest efforts to document real estate research trends was documented in 2003 and included a Eurocentric focus. Nummelin (2003), the author of the document, carried out a report on the Finnish real estate market and the broader international landscape. He ultimately concluded that research efforts in different areas have been tailored to achieve sustainable development and market growth. The author also found in addition that some of the core research foci included: urban real estate; portfolio and asset management; corporate real estate and development; and workplace, home, and user requirements. However, the study's primary focus on Finnish real estate limited the study to a quite narrow scope that therefore cannot accurately represent real estate research trends in Europe as a whole. The methodology for Nummelin's report was also not clearly defined and can therefore only be considered a narrative reporting that might be simply subject to the author's interests and bias towards certain markets.

Dombrow and Turnbull carried out in 2004 a much broader and comprehensive investigation of real estate research trends which spanned a period of 13 years (1998-2001). Their paper specifically investigated publications and citations for topic and technique trends in the Journal of Real Estate Finance and Economics (JREFE) and Real Estate Economics (REE). They concluded that real estate research is dominated by certain topics and is largely an empirical field. While their research and conclusions provide valuable contributions to real estate research trends, the focus of the study is again restricted because of its reliance on just two journals. Unsurprisingly, the limited research does not truly speak to the African perspective that this study proposes to address.

The conclusions reached in the 2008 research produced by Chan et al. reveal how there is a lack of focus and inclusion of African research in top global publications in real estate. The absence of significant African research in Chan et al.'s study emphasizes the need for greater recognition and inclusion of African research in the international academic sphere. On a more global scale, their study also includes an evaluation of the research contributions produced by international researchers and institutions between 1990 and 2006. What they discovered was that North American universities dominated real estate research literature, while Asia-Pacific and European regions had in fact increased their influence. They attribute these trends to the importance of real estate investment in these countries and substantial economic growth, while real estate research has informed the subsequent allocation of resources and human capital within these growing regions.

Acheampong et al. only provide information in their 2002 research on property research priorities in Australia despite their focus on Asia, while Newell et al. (2004) provide what is deemed an 'international perspective' on real estate research priorities despite their inclusion

of limited information on Africa. Adnan et al. provided the first study in 2011 of the contribution of Malaysia to some leading real estate research journals and conferences in the United States, United Kingdom, Asia, Australia, and Malaysia. The study examines both international and local papers presented at main real estate conferences from 1997 to 2010. These conferences include: the American Real Estate Society (ARES); the European Real Estate Society (ERES) and other local conferences including the International Real Estate Research Symposium (IRERS). Adnan et al.'s study use a desktop research approach to explore research papers published in leading real estate journals such as: the Journal of Real Estate Research (JRER); Journal of Real Estate Finance and Economics (JREFE); and similar publications. Their study situated the Malaysian real estate researchers (MRERs) as significant positive contributors to global real estate research. They also emphasise the importance of government commitment to the real estate research agenda.

Other similar studies (Breuer and Nadler, 2012; Abatecola et al., 2013; Breuer and Steininger, 2020; Nguyen et al., 2021; Just et al., 2021) that have looked at research contributions within the International Real Estate Society (IRES) structure have also focused only on the American Real Estate Society, (ARES) and European Real Estate Society (ERES). They note a disproportionate focus on empirical studies within the finance and investment themes. Furthermore, they note that this creates a gap in the interdisciplinary aspects of the discipline and the theoretical foundation of real estate. Moreover, these research paradigms seem to be reliant on the mature, developed and highly formal markets which exclude the African continent. Most of these studies have also drawn their data from two journals - the Journal of Real Estate Finance and the Journal of Economics and Real Estate Economics. This might explain why the research focus and agenda have tilted disproportionately towards finance and investment topics. Nguyen et al. (2021) provide a list of 9 trends that have dominated real estate research. These include:

1. Performance and investment features of property.
2. House price – household income, consumption, and investment.
3. House price setting.
4. Amenity in property valuation.
5. Green factor in the property market.
6. Housing discrimination and segregation.
7. Urban development.
8. Modelling for the real estate subsector; and
9. Urban transformation in cities of China.

Overall, these areas of research have had little to no reference to the African context which suggests that either research on African real estate does not exist or, less likely, that it does not particularly add to the global body of knowledge. Considering that African universities and institutions of learning are increasingly training students to work in the real estate sector, this cannot be the case. Therefore, this study intends to fill this gap by exploring the content of the African Real Estate Society conferences to evaluate both the nature and value of these contributions as well as assessing the trends found within.

3. Methods

This study is based on a descriptive content analysis of abstracts presented at the African Real Estate Society (AfRES) Conferences which were extracted from the AfRES website (https://afres.architexturez.net/) and subsequently analysed. Roulac et al (2004), in a similar study of global real estate appraisal research agenda, have found this method valuable through their use of the data taken from the American Real Estate Society (ARES), the European Real Estate Society (ERES), the Pacific Rims Real Estate Society (PPRES) and the Royal Institution of Chartered Surveyors (RICS) conferences. The analysis covered the period from 2011 to 2022, though the study excluded the year 2020 as no conference was held due to the outbreak of the coronavirus. The choice of the research duration was regulated according to the availability of data from the AfRES website, and a total of 500 abstracts presented at the AfRES conference were analysed over the 11-year period.

Research themes and subthemes were categorised manually in this paper following the classification of Dombrow and Turnbull (2004). These classifications were subsequently adjusted and modified based on feedback and comments from two senior academic researchers in real estate during the process of validating the categorisations. The modified categorisations are presented in Table 1 below. Classifying the abstracts revealed that while some topics/abstracts fit under one research theme, other abstracts/topics fit under more than one research theme.

Extant studies such as Dudovskiy (2011) and William (2007) have identified three methods of research - quantitative, qualitative, and mixed-method research. The authors examine the research methods across four major directions: quantitative, qualitative, mixed method and review/theoretical. Studies that use a quantitative research approach employ surveys and collect data on predetermined instruments. Those in the category of qualitative approach are studies which use case studies, ethnographic, phenomenological, or grounded theories and content analysis. The other direction/category is the mixed method. The mixed method approach includes studies that employ a combination of quantitative and qualitative approaches. Lastly, the fourth direction is the review/theoretical approach. Abstracts/titles grouped under this category include studies based on the review of past studies or studies based on theoretical arguments.

Table 1: Categorisation of Themes and Sub-themes

Themes	Sub-themes
Appraisal/Valuation	Pricing, Rent Analysis, Valuation of Property, Market/Property Data and Valuation Methodologies, Physical and Neighbourhood attributes, Property Indices, Feasibility and Viability Appraisal
Housing and Real Estate Markets	Housing Markets, Land Markets, Property/Real Estate Markets, Rental markets/Residential Real Estate, Vacancy, Market Maturity and Market Transparency
Institutions	Property Rights, Land Acquisition/ Registration, Gender Issues, Contracts and Leases, Land Administration/ Governance/Management, Land Delivery Systems

Finance and Investment	Direct Real Estate Asset Returns/Performance Measurement, Indirect Real Estate Asset Returns/Performance Measurement, Diversification/Portfolio Analysis, REITs, Macro and Micro Economic Factors, Housing Finance/Housing Finance Options, Infrastructure Finance and Real Estate Development
Mortgages	Mortgage Pricing, Prepayments and Default, Secondary Mortgage markets, Mortgage Finance/Mortgage Systems and Markets
Non-Residential Real Estate	Office Properties, Retail and Shopping Centers properties, Agricultural Lands, Hotel Properties
Public Policy	Land Use Regulations and Planning, Property Taxation/ Rating, Urban Regeneration/Renewal, Public Housing Policy, Flood Risk, Compensation/ Compulsory Acquisition
Real Estate Education	Curriculum Development, Teaching Pedagogies, Real Estate Students Skills, and Competencies
Real Estate Law	Real Estate Law, Alternative Dispute Resolution, Conflict Management
Sustainable Real Estate	Sustainable Real Estate
Real Estate Management/ Maintenance	Property Management, Corporate Real Estate, Facility Management, Special Purpose Property
Research and Emerging Trends	Real Estate Research, Emerging Trends

Modified Themes and Subthemes, Based on Dombrow, and Turnbull (2004)

Finally, though it was an Africa Real Estate Society (AfRES) conference, there were abstract submissions whose location of study was outside of Africa. Thus, the locations where the study was focused were also examined in this paper. These were examined under four headings: Africa, Outside Africa, Global and Not Specific. Studies that have no clear location of focus, these especially being review/theoretical papers, were grouped under the "Not Specific". The research themes, locations of the studies and research methods were analysed using descriptive analyses of frequency counts and percentages.

4. Analysis and Discussion

The analysis and discussions are presented based on the three main directions of the study - the research outputs and contribution by countries, the analysis of the research themes and the trends in the research methods employed. These are presented below in Sections 4.1, 4.2 and 4.3 respectively.

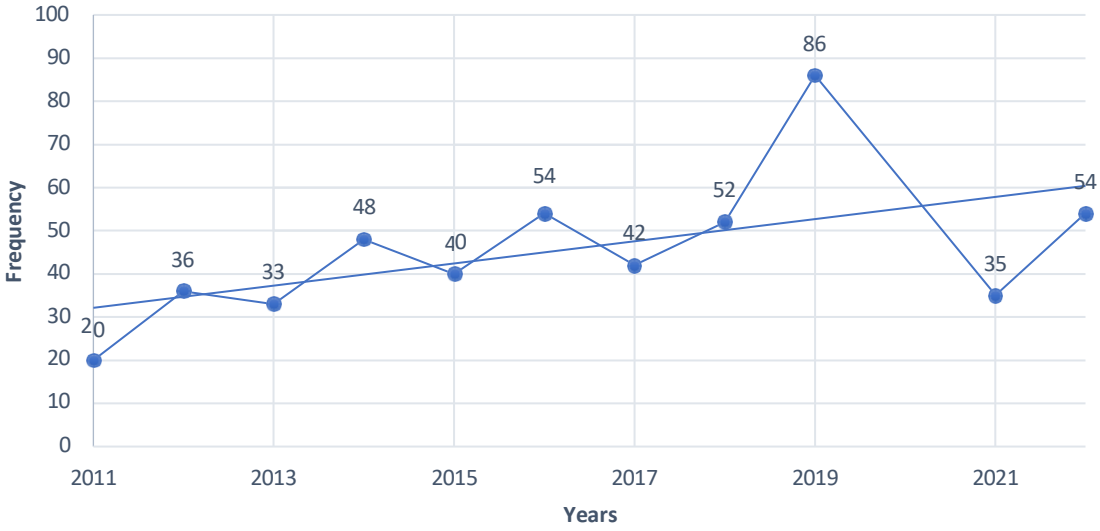
4.1 Analysis of Total Research Outputs and Contribution by Country

4.1.1 Annual Total Research Outputs

An examination of the annual total research outputs based on the abstracts, as shown in Figure 1, reveals a fluctuating pattern in the research outputs, though overall growth in contribution as evidenced in the trend line. The sharp decline in 2021 might be due to the slow recovery, triggered by the effect of the COVID pandemic. The output pattern suggests a consistent trend

in the submission, perhaps because the AfRES conference is the only major real estate conference across the Continent that brings real estate professionals and academics together.

Figure 1: Annual Total Research Outputs from 2011 to 2022



4.1.2 Research Outputs by Country

The analysis of the country where the research was focused/conducted is presented in Figure 2 and Table 2. The result shows that Nigeria had the highest abstract submission, representing an overall average of 31.60%. This is followed by Ghana and South Africa, having 14.20% and 13.20 respectively. The results suggest that, cumulatively, there were more abstract contributions from the West African region than other African regions as Nigeria and Ghana cumulatively accounted for 45.80% of the total contributions over the 11 years considered. The result suggests that most Northern African countries are not actively participating in the AfRES conferences, as opposed to a thriving membership base in Western, Eastern and Southern Africa. The high volume of abstract contributions by Nigeria, Ghana, and South Africa in the AfRES conferences might be due to their strong and vibrant real estate sector evidenced by a strong GDP. According to Chan et al. (2008), increasing trends in real estate research across markets are directly linked to the importance of real estate investment and substantial economic growth in these countries.

Analysis of the abstract submissions also revealed how few contributions were made in the early years and how contributions later peaked at 5 papers in 2018. The research focuses on African real estate markets subsequently dipped in the following years with an overall contribution of 4.20%. When analysing abstract contributions from countries outside of Africa, results showed that there was a peak annual contribution of 6 papers and 5 papers in the years 2014 and 2019 respectively, and an overall percentage contribution of 4.20% over the 11 years. Abstract submissions focused on the USA and Canada have the highest cumulative contribution of 4 and 3 papers respectively. The low abstract contributions from countries outside of Africa might arguably be because the AfRES conference focuses primarily on issues related to real estate within the African continent.

Figure 2: Total Outputs by Country, 2011 to 2022

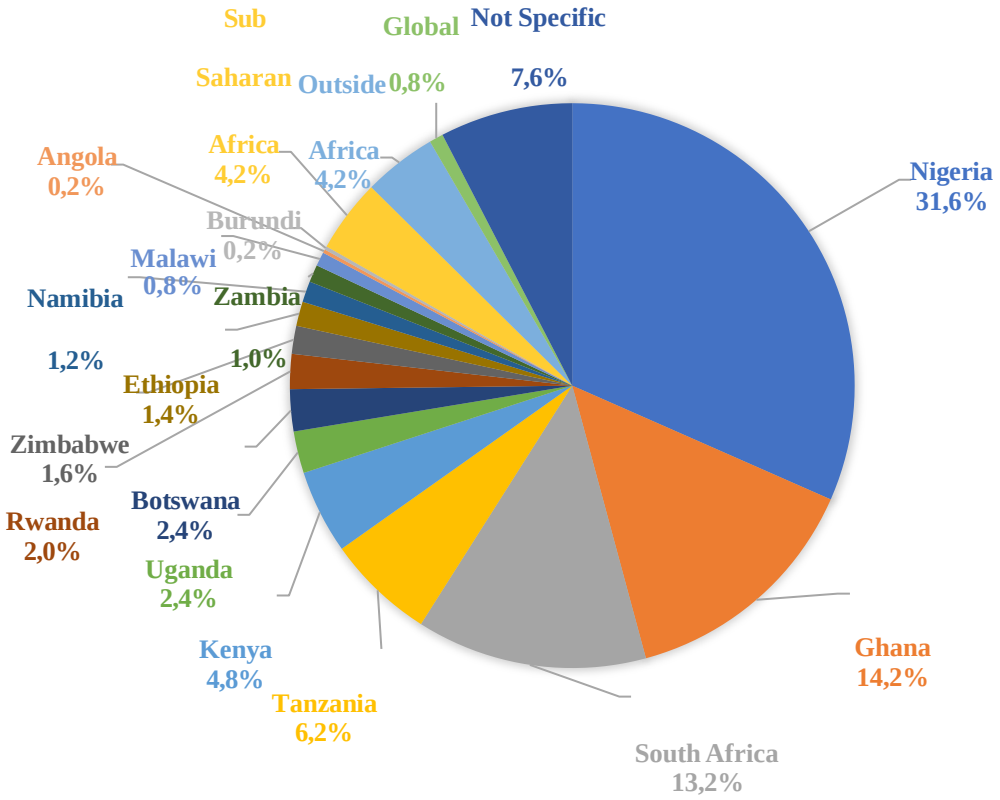


Table 2: Analysis of Countries where Research was Focused

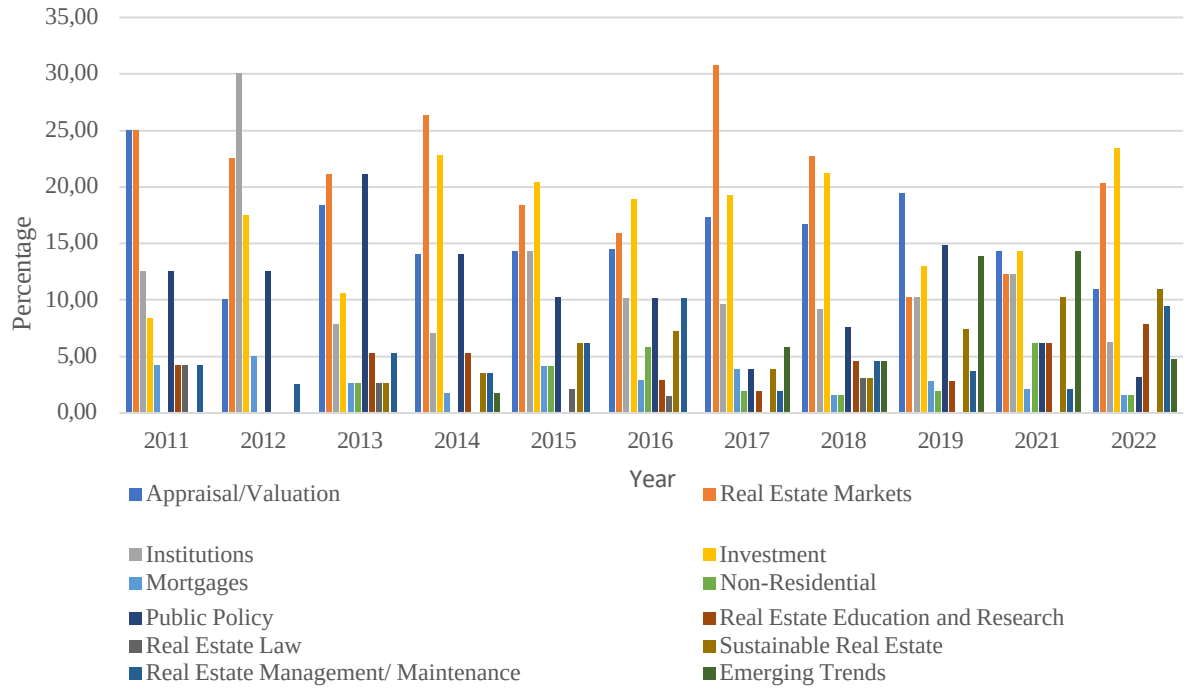
Country of Focus	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022	Total Freq.	Total %
Africa Focused	**16**	**32**	**31**	**37**	**38**	**47**	**32**	**48**	**74**	**30**	**52**	**437**	**83.20**
Nigeria	1	15	19	15	16	12	12	27	17	10	14	158	31.60
Ghana	4	8	2	4	12	6	5	6	11	3	10	71	14.20
South Africa	4	5	2	13	3	3	7	4	7	7	11	66	13.20
Tanzania	2	2	1	0	2	2	1	1	17	1	2	31	6.20
Kenya	1	0	3	1	1	7	2	1	5	2	1	24	4.80
Uganda	1	1	1	0	1	3	2	0	3	0	0	12	2.40
Botswana	0	0	0	0	0	1	0	1	3	3	4	12	2.40
Rwanda	0	0	2	0	1	3	0	2	2	0	0	10	2.00
Zimbabwe	0	1	0	0	0	2	0	0	2	1	2	8	1.60
Ethiopia	0	0	0	1	0	6	0	0	0	0	0	7	1.40
Namibia	3	0	0	0	0	0	1	1	1	0	0	6	1.20
Zambia	0	0	0	0	0	0	0	0	1	2	2	5	1.00
Malawi	0	0	0	0	0	0	1	0	0	0	3	4	0.80

Angola	0	0	0	0	0	1	0	0	0	0	0	1	0.20

Burundi	0	0	0	0	0	0	0	0	1	0	0	1	0.20
Sub Saharan Africa	**0**	**0**	**1**	**3**	**2**	**1**	**1**	**5**	**4**	**1**	**3**	**21**	**4.20**
Outside Africa	**2**	**0**	**0**	**6**	**0**	**2**	**1**	**2**	**5**	**2**	**1**	**21**	**4.20**
United States	0	0	0	2	0	1	0	0	1	0	0	4	0.80
Sweden	2	0	0	1	0	0	0	0	0	0	0	3	0.60
Australia	0	0	0	1	0	0	0	0	1	0	0	2	0.40
Mauritius	0	0	0	1	0	1	0	0	0	0	0	2	0.40
Germany	0	0	0	0	0	0	1	1	0	0	0	2	0.40
UK	0	0	0	0	0	0	0	0	0	2	0	2	0.40
Europe	0	0	0	0	0	0	0	1	0	0	1	2	0.40
South-east Asia	0	0	0	1	0	0	0	0	0	0	0	1	0.20
India	0	0	0	0	0	0	0	0	1	0	0	1	0.20
Malaysia	0	0	0	0	0	0	0	0	1	0	0	1	0.20
Netherlands	0	0	0	0	0	0	0	0	1	0	0	1	0.20
Global	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**4**	**0.80**
Not Specific	**2**	**3**	**2**	**5**	**2**	**5**	**8**	**1**	**7**	**2**	**1**	**38**	**7.60**
Total	**20**	**36**	**33**	**48**	**40**	**54**	**42**	**52**	**86**	**35**	**54**	**500**	100

The results of the study suggest that the regional rotation of the conference hosting rights across countries also contributed to the increased abstract submissions of the hosting countries to the AfRES conference. For instance, South Africa hosted AfRES in 2014 and had the second-highest contribution (f = 13; % = 27.08) after Nigeria (f = 15; % = 31.25). This outcome might be strongly linked to South Africa's role as the hosting nation. The same trend was found when Ghana hosted the AfRES conference in 2015 where abstract submissions from Ghana totalled 30.00% of the total submissions for 2015, and again when abstract contribution from Tanzania rose to 19.77% when they hosted the conference in 2019. The increased publication from hosting countries could also be attributed to the ease of access that the contributors from the host countries had, as opposed to the expensive sums required to travel to other parts of the continent where the conference is being held. The trend was not observed in 2021, which was hosted by Zambia – though this was perhaps due to the virtual/online nature of the conference as opposed to the usual physical in-person format.

Figure 3: Research Themes from 2011 to 2022



4.2 Analysis of Research Themes

An examination of the research themes from 2011 to 2022 is presented in Figure 3 above. The results show that research on the Housing and Real Estate Markets topic dominated submissions across most of the years, except for the years 2019 and 2021. It should also be noted that the high percentage of research on Housing and Real Estate Markets may be because of the prominence of the topic in the AfRES conference. This can be seen in Appendix A which shows how the AfRES themes for the years 2011, 2013, 2014 and 2018 all centered on Real Estate Markets.

Another dominant area of research includes Appraisal/Valuation and Finance and Investment, with the theme ranking high in 7 of the 11 years under consideration. The years 2011 and 2012 are the exception to this trend. The increased ranking of research interest in Appraisal/Valuation and Finance and Investment may be attributable to the increasing change in perceptions of real estate assets as a tradable commodity and liquid asset rather than simply 'brick and mortar'. In addition, the increasing allocation of real estate assets in investors' portfolios may be owed to the superior investment performance when compared with other asset classes - and in turn influence research interest in this direction.

Housing and Real Estate Markets, Finance and Investment and Appraisal/Valuation seem to be the major areas of interest for researchers, the opening and expansion of investment across the African real estate markets - as noted by Akinsonmi et al. (2015) - could be seen as additional major triggers. The period under consideration seems to have witnessed a largely stable democratic system of governance and relative stability across most African markets, thereby enabling investment and research across areas of investment, valuation, and appraisal. Additionally, data shows that there has been increased research interest in this area in recent years, despite low rankings in the first 6 years – from 2011 up to 2016. This suggests the growing importance and relevance of research in a fusion of real estate activities and technological innovations within African real estate markets. They also suggest that African researchers participating in the AfRES conference, and the discourses being generated have

kept abreast with global innovations and evolving practices concerning real estate research. The AfRES themes for the latter years of 2017 to 2022 provide evidence of this Appendix A presents how the AfRES conference included themes such as defining the future of Real estate in Africa; developing new frontiers for the real estate sector; balancing real estate academic and industry outlook; and considering the future of Africa's real estate sector. The choice of these conference themes played a role in influencing the increased research in these areas – particularly given the need to ensure that the real estate practice in Africa is not behind its global peers.

Research that focused on Sustainable Real Estate has had a fair level of prominence among the research themes during the period considered, ranging from 2.6% in 2013 to 10.94% in 2022. Though this theme consistently ranked as the least researched for the first three years, contributors showed a greater level of in the subsequent years. The increased interest in the topic could also be tied to increased awareness of the need for sustainable practices and an acknowledgement of the important role the real estate sector serves in mitigating harmful environmental practices. While Simons et al. (2022) note an increasing interest in sustainable real estate research globally it appears that the contributions to the ARES conference which focused on sustainable real estate in the African space are just beginning to gain momentum in comparison with global interest in sustainable practices.

The rise in ratings for abstract submissions relating to Institutions and Public Policy themes could have been a result of increased awareness of issues related to gendered land access and land rights; property tax; land administration/governance/management; property rights; land acquisition and registration; land delivery systems; and compensation/compulsory acquisition among others. This underscores the need for sound institutions and policies relating to land issues to improve investors' confidence and enhance transparency in land transactions. Ultimately, poor institutions will significantly hamper market development.

An examination of the aggregates for each of the thematic areas, as presented in Figure 4, shows that Housing and Real Estate Markets, Finance and Investment and Appraisal/Valuation ranked as the top three areas dominating research interests at the AfRES conferences. These areas respectively contributed 19.32%, 17.69% and 15.75% of the total submissions over the 11 years and a combined cumulative of 52.76% of the total submissions to the AfRES conference papers. This suggests that issues which affect investment decisions, housing, real estate markets, asset valuation and appraisal by local and international investors are increasingly taking centre stage. Research in these areas could undeniably be of immense help towards making sound investment decisions.

Other studies, such as Breuer and Steininger (2020), Nguyen et al. (2021) and Just et al. (2021), have shown that there was an increased focus on the finance and investment themes in real estate research. This assertion is supported by the rise in investors' appetite for cross-border investments across African markets, alongside their need to understand the uncertainties that come with these markets in terms of investment risk, market volatility and institutional development.

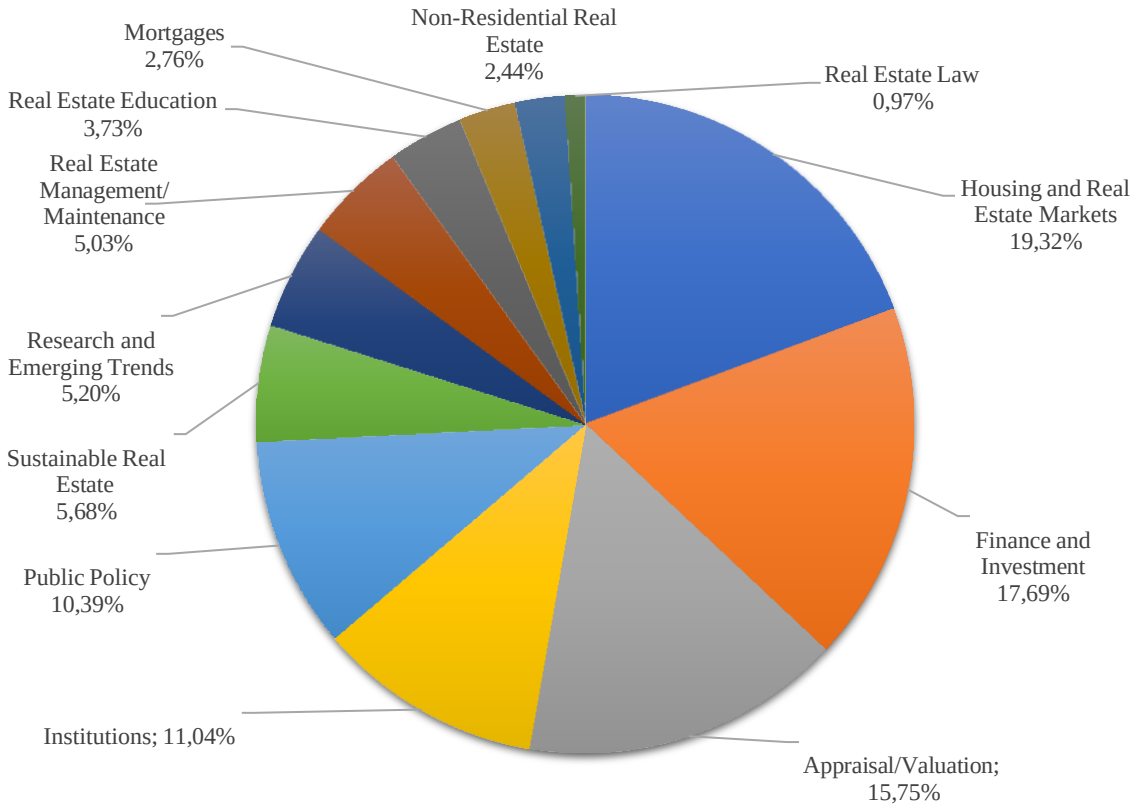


Figure 4: Research Interests from 2011 to 2022

The aggregated thematic areas show that submissions relating to Sustainable Real Estate and Research/Emerging Trends in real estate accounted for 5.68% and 5.20% respectively of the total submissions. The increasing focus on green development and sustainability issues aligns with the arguments made by Nguyen et al. (2021), who identified sustainability as one of the major trends that have dominated property research. The impact of the real estate sector in mitigating environmental issues cannot be overemphasised, as well as the need to ensure that environmental considerations are well balanced in the context of real estate decisions and investment could have spurred research interest in these areas. In addition, the growing integration of digital technology and artificial intelligence into real estate practices and the built environment, in general, has increased in recent years, raising the need for researchers in these areas to explore the implications arising from these developments.

The Real Estate Education theme contributed a total of 3.73%, which is expected considering that research on real estate graduate competencies and skill sets required to meet the demands of the emerging real estate markets has been increasingly explored. The need for skill sets and competencies of graduates to address dynamic market peculiarities comes to the fore, with market dynamics that are changing and technological innovations that are increasingly integrated into real estate practices. It is thus encouraged that topics that could foster real estate graduate skill sets and reduce identified skill gaps identified by real estate employers be examined.

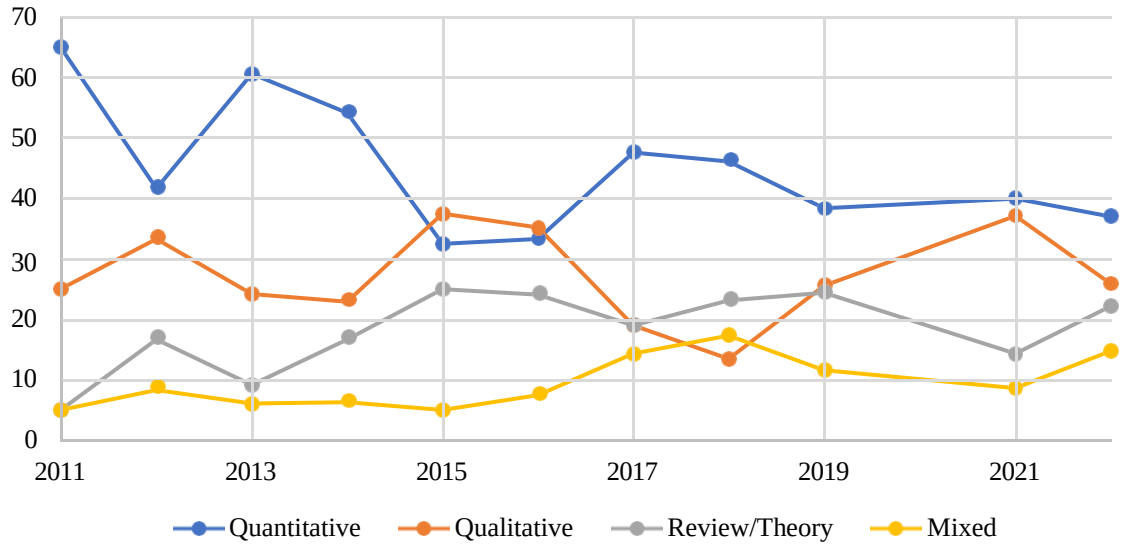
Topics relating to mortgages were not dominant in the submission to AfRES conferences over the study period. Mortgages might not have been a dominant area of research because mortgages are not predominantly established in most African Markets. Studies undertaken by Asabere et al. (2016) note that most African countries have mortgage markets that are still at

the developmental stage, with peculiar barriers hindering the growth and expansion of the mortgage system. For example, Ghanaian and Nigerian markets – which offer the most submissions to AfRES conferences – have not yet developed a fully functional and subscribed mortgage system, unlike the far more advanced South African market.

4.3 Trends in Research Methods Employed

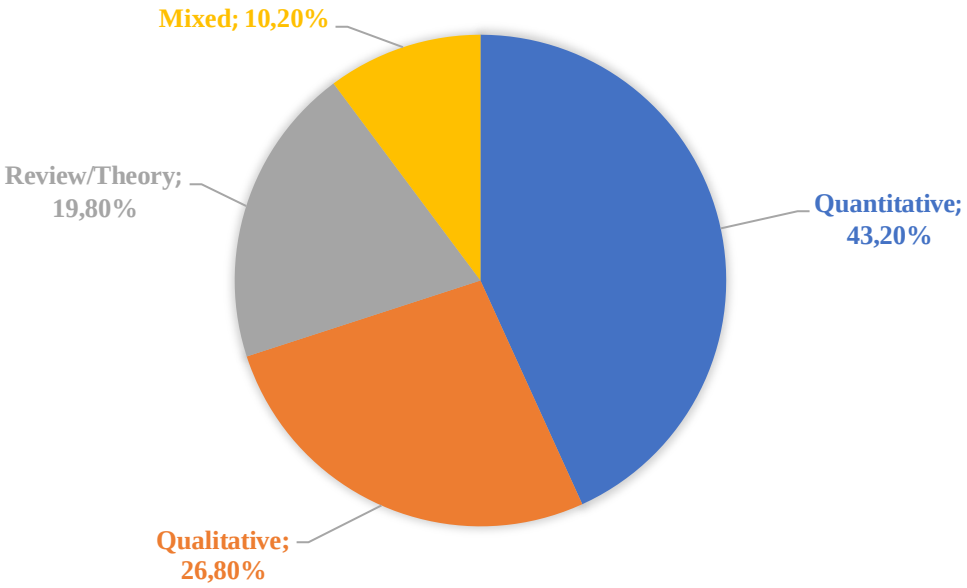
This study additionally evaluated the research methods employed by the contributors/authors of the AfRES conference from 2011 to 2022. The analyses are presented in Figure 5, with results showing a high usage level of quantitative techniques overall, with the years 2015 and 2016 showing the most. The adoption of qualitative techniques consistently ranked second for most of the years under consideration. The results suggest that authors seem to be more comfortable with the use of quantitative techniques, perhaps owing to the method's simpler form of analysis as opposed to the complexities of the qualitative method.

Figure 5: Trends in Research Methods Adopted 2011 to 2022



Abstract submissions that employed review/theoretical methods ranked third for most of the study period. The results also reveal an upsurge in the choice of review/theoretical papers in the latter years of 2017 to 2022, with an average of 20.61%, while the earlier periods of 2011 to 2016 have an average of 16.08%. The adoption of mixed research methods by authors is consistently ranked the least over the period analysed. There is however an increase in the adoption of mixed methods from years 2017 to 2022. Overall, as shown in Figure 6, quantitative methods accounted for 43.20%, while qualitative and mixed methods accounted for 26.80% and 10.20% respectively. Abstract submissions that employed review/theoretical methods accounted for 19.80% over the 11-year study period. The findings therefore align with the submission of Dombrow and Turnbull (2004), who noted that the field of real estate research is largely an empirical field of study rather than a review or theoretical methods of analysis. al methods of analysis.

Figure 6: Research Methods Adopted



5. Conclusions

The AfRES conferences have served as a unifying platform for real estate practitioners and researchers across Africa and beyond – ultimately playing an integral role in the development of the real estate profession. The conferences have the potential to make a significant contribution towards solving the practical problems of the real estate industry from an African perspective. Thus, while the AfRES conference appears to be a foremost specifically African real estate conference, it is important to undertake an analysis of its research contributions through the evaluation of the conference proceedings. There is accordingly a need to provide a retrospective perspective of the contributions of the AfRES to research and learning in the African real estate space by understanding the direction that the AfRES conferences have taken and gaining insights into future directions the AfRES may take. Based on a desktop review of 500 abstracts published in the AfRES Conference proceedings, this paper investigated the real estate research trends and directions in Africa between 2011 and 2022. The study specifically examined the total research output and contributions by countries to the AfRES conference and assessed the themes that have received the most attention in African Real Estate Research. In addition, the emerging trends in real estate research across the continent were analysed, alongside the research methods that are mostly employed by authors at the AfRES conference.

An examination of the abstract submissions showed an increased contribution to the AfRES conferences over the study period. The study also found that there have been significant contributions from Nigeria, Ghana, and South Africa in comparison to other African countries. This outcome could be linked to the comparative market size especially, as it relates to the population of these countries, the need for research to justify investment and the creation of solutions for issues within the real estate sector. Moreover, the rotation of the conference hosting rights across countries also contributed to the increased abstract submissions by the hosting countries to the AfRES conferences. Analysis of the research themes in abstract submissions revealed a consistent preference for themes in the areas of housing/real estate market, finance/investment, and appraisal/valuation. Themes related to research/emerging trends and sustainable real estate have in recent years had an increase in abstract submissions

This trend could arguably be linked to an increased call for research related to sustainability and other emerging trends in the African real estate sector, as well as the need to keep pace with global best practices. The results show a significant preference for quantitative analyses, supported by the argument that real estate research is in general predominantly empirical.

The rapidly expanding knowledge base in the field of real estate presents both unique challenges and opportunities. The dynamic nature of the real estate market in Africa has significant political, social, and economic implications for academics, practitioners, and policymakers alike. The research trends suggest increasing market sophistication and a catching up with global discourse in real estate trends.

The study has ultimately assessed the trends in real estate research in the African market from the abstract submissions to the AfRES conferences. As the study has not examined other real estate journal publications – both within and outside Africa – there is a great opportunity for further study. These studies could include an examination of broader real estate research avenues on the African continent - such as the Journal of African Real Estate Research and other regional research outlets and conferences. This could give a more detailed perspective on the trends and research focus. The findings herein can, however, serve as a basis to stimulate interest in monitoring the directions in African real estate research and benchmarking this against global research trends and expectations in the real estate sector.

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Appendix A

Year	Venue	Theme
2022	Accra, Ghana	Redefining the Future of Real Estate in Africa
2021	Lusaka, Zambia	The Future of the African Real Estate Sector: What Next? (ONLINE)
2020	-----	-----NO CONFERENCE-----
2019	Arusha, Tanzania	Developing New Frontiers for African Real Estate Sector
2018	Abeokuta, Nigeria	Integrating the African Real Estate Market – An Agenda
2017	Johannesburg, South Africa	Balancing Real Estate Academic and Industry Outlooks
2016	Addis Ababa, Ethiopia	Sustainable Multi-Sectoral Real Estate Development in Emerging Economies
2015	Kumasi, Ghana	Real Estate Markets Developments: Meeting the Challenges, Making the Difference
2014	Cape Town, South Africa	Urban Real Estate Markets: A Catalyst for Economic Growth and Development
2013	Kigali, Kenya	Unleashing the Value of the Different African Real Estate Markets
2012	Accra, Ghana	Unlocking the African Real Estate Potentials
2011	Windhoek, Namibia	Land & Property Markets: Post Global Economic Recession: Challenges to Africa