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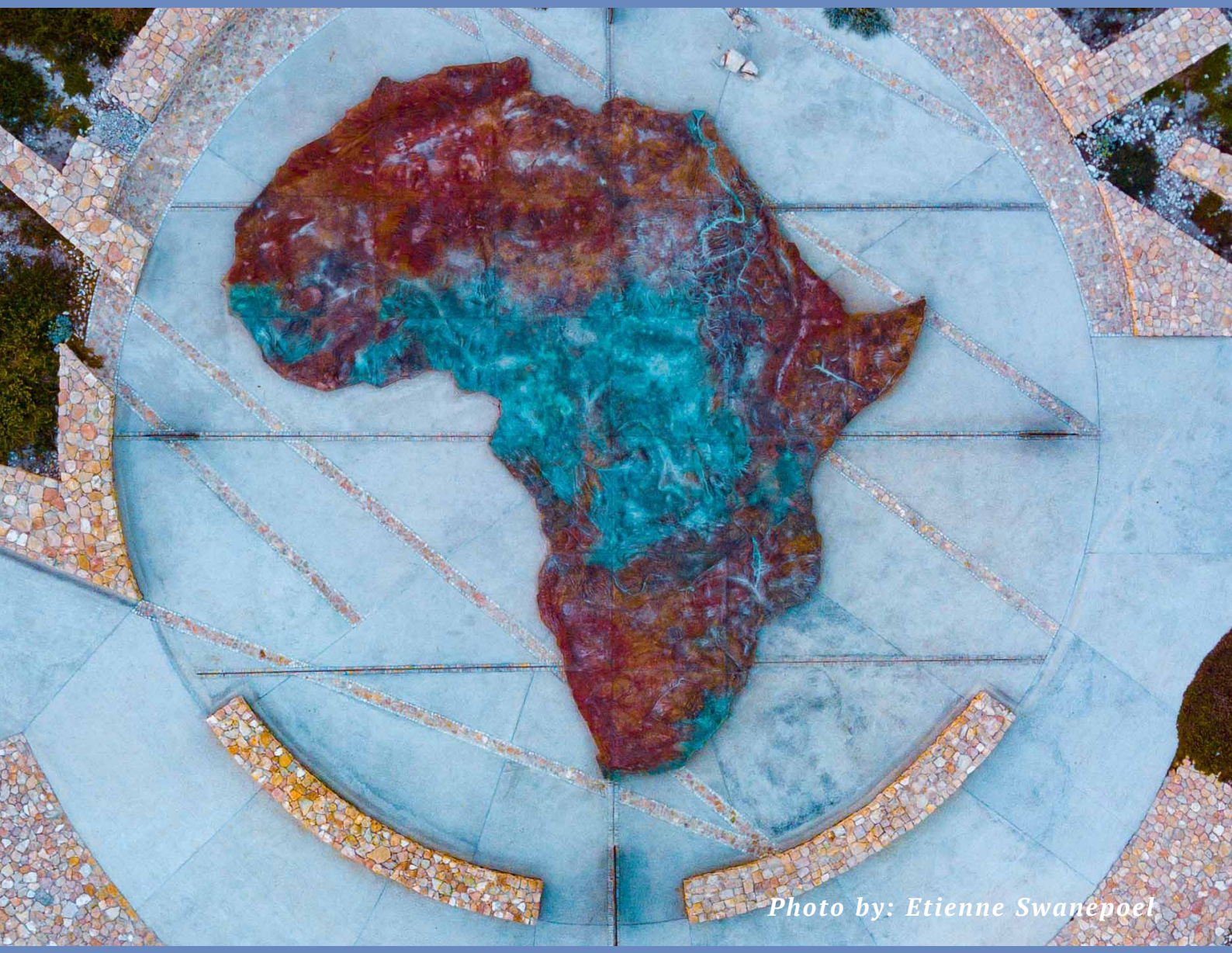

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Editorial for JARER Vol. 6 Issue 2, 2021

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Editorial

Welcome to Volume 6 (2021), Issue 2 edition of the Journal of African Real Estate Research (JARER). JARER has provided valuable resources that support academics and professional researchers in Africa and those interested in the African continent. Our journal offers an exciting platform for disseminating scholarly and the different types of applied research engaged within the real estate sector in Africa. This issue is coming as the first regular issue of 2021. The journal's first issue gave way for the Special Issue published in June 2021. For this reason, we want to apologize to the authors whose papers were accepted earlier in the year for the delay in publication. To forestall this situation in the future, the JARER management team has decided to start publishing individual papers in digital format on our website, once accepted and while waiting to be published with a full issue at the appointed time.

Karen Gibler and Geci Karuri-Sebina's diligent and painstaking efforts in supporting the journal with the successful publication of the special issue titled: Women in African Real Estate and Urban Development Research are highly appreciated. Our gratitude also goes to the journal editorial board members and the anonymous reviewers, who have been supporting and inspiring the management team, making it possible for us to improve the rate of submissions. We appreciate the continued support of the African Real Estate Society board members. Similarly, we appreciate the constant support we receive from the team and colleagues at the Library Services for the University of Cape Town, South Africa. We like to put on record the assiduous efforts of our former managing editor - Mr Luke Boyle - whose diligence and teamwork we so much enjoyed, and as he heads on to other endeavours in his life, we wish him the best. The untiring efforts of our new managing editor - Ms Lesedi Kgaka - with a view to moving the journal's operation forward and onto the next level are highly appreciated. Our

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thanks go to Prof. Karl-Werner Schulte and his team from the IREBS at Regensburg University, the IRES, ERES, from whom JARER continues to receive strong support.

The current issue contains seven papers focusing on a wide range of topics covering diverse areas of interest in gender differential in real estate entrepreneurship, integrated rural development, housing affordability, indoor environmental quality, tenure security, resource utilization and automation in valuation.

The first paper's focus is on the potential of integrated rural development schemes for improving rural housing infrastructure. A case study of the Rural Development Programme (RUDEP) of Justice Development and Peace Makers' Centre (JDPMC), a non-governmental organization in Osun State, Nigeria, was conducted. The findings led to the conclusion that the RUDEP integrated scheme could be a viable policy option for improving the condition of rural housing in Nigeria.

The apparent domination of the real estate business environment by the male gender and the entrepreneurial intentions of men and women in the real estate sector are the concerns of the second paper from Nigeria. The paper studied the intentions of real estate students at three Nigerian universities to understand better barriers and supporters that shape students' entrepreneurial intentions. In doing this, the paper showed how gendered differences might impact on students' entrepreneurial aspirations. The conclusion suggests gender-based differences in the entrepreneurial aspirations of real estate students in Nigeria.

The third paper evaluated the Nigerian Tertiary Education Trust Fund (TETFund) intervention projects and space utilization in Nuhu Bamalli Polytechnic (NUBAPOLY), Zaria, Kaduna state, Nigeria. The results revealed that the construction of new buildings and laboratory equipment and furniture provided the main focus of TETFund intervention projects. At the same time, the overall space utilization for NUBAPOLY stood at 43.60%. The paper recommended that TETFund ensure adequate utilization of its intervention projects through supervision and inspection, while the management of Nuhu Bamalli Polytechnic should make optimum utilization of TETFund intervention projects.

The fourth paper examines property valuers' perceptions on the adoption of automated valuation models (AVM) in rating valuation against the use of traditional valuation methods in Malawi. The findings showed that the general perception of Malawi's valuers towards AVM was mixed. While one school of thought gave AVM the benefit of the doubt for future incorporation into the profession if modified to suit the local environment, the other hand considered AVM a threat to the valuation profession since anyone may be deemed qualified to carry out property valuation. The conclusion was that AVM could be adopted as a supplement to the traditional valuation methods but not a replacement.

The problem of land tenure security with a view to promoting and motivating land-based investment has been the focus of many countries and development partners and calls for a continuous effort at addressing this critical issue. This is the focus of the fifth paper. The paper explored the factors affecting tenure security for legal landholders in Bahir Dar City in Ethiopia. The results suggest that the perception of landholders about land tenure security was low, with consequences for disinvestment and lack of confidence of ownership on the land and property held in the city and fear of expropriation or involuntary relocation.

The sixth paper is a literature review of research methods that seek to establish the measurement of individual productivity and organizational performance in office buildings containing enhanced green building features and initiatives that specifically focus on indoor environmental quality (IEQ). The paper used the PRISMA framework and included thirty-nine academic papers from 2000 to 2020 to discuss different research instruments such as post-occupancy evaluations (POE), longitudinal surveys, and interviews. The key findings highlighted that individual productivity was measured via self-assessment in previous research. At the same time, no research had successfully measured organizational performance within the context of green building features and initiatives.

Our sincere hope that you will find the papers in this issue of the Journal of African Real Estate Research interesting, thought-provoking, and informative. We appreciate and encourage feedback from readers on their views of this and previous issues of the journal.

Prof. Abel Olaleye
Editor-in-Chief

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Potentials of Integrated Rural Development Schemes for Improving Rural Infrastructure

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Abstract

The idea of the Integrated Development Scheme (IDS) has received considerable attention in India, Indonesia and in some African countries such as Kenya and Ethiopia. The scheme has led to urban slum upgrading in these countries and has led to notable successes in the provision of common facilities in the rural areas of India. Therefore, given the neglect of rural areas by both private and public sectors, and the need to improve the housing conditions of rural dwellers, this paper examines the benefits of improved livelihoods from the scheme to improving rural housing conditions in Nigeria. A case study of the Rural Development Programme (RUDEP) of Justice Development and Peace Makers' Centre (JDPMC), a non-governmental organisation in Osun State, Nigeria, was conducted. Stratified and purposive sampling was used to select 344 participants/beneficiaries of the programme from 28 active communities out of the 36 communities' coverage by RUDEP. Qualitative and quantitative data obtained from the respondents was analysed using descriptive statistics of percentages and frequency distributions. The results revealed that the RUDEP integrated scheme, which was first initiated with the objective of improving the livelihood of poorer farmers and women that engaged in agricultural-related activities, has also impacted rural housing conditions positively by empowering them to provide facilities that were not initially in place. The paper concluded that IDS could be a viable policy option for improving the condition of rural housing in Nigeria.

Keywords: integrated housing scheme, rural housing provision, sustainable livelihood approach, RUDEP scheme, Nigeria

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1. Introduction

Rural areas are essential components of the entire fabric of any nation. They are often considered the most neglected parts of a country and are primarily viewed as a low priority in government developmental efforts (Tiwari, 2007). The fact that the rural areas are not a priority area of living for many citizens has justified the daily emigration of many to cities. They travel in hopes of greener pastures and employment. The need to improve rural infrastructure is expedient because the economy is mainly dependent on subsistence agriculture, with few, if any, infrastructure facilities (Nyagba, 2009; Abah, 2010). With a high poverty rate and absence of basic facilities/infrastructure, the state of rural areas in many parts of the world is calling for attention (Department for International Development (DFID), 2015).

A review of government development policies in many countries such as India, Kenya and Nigeria further revealed the neglect of rural areas in such government development policies. For instance, from the Indian perspective, Tiwari (2007) found marginalisation of rural housing. More so, the rural development needs are generally ranked lower than urban developmental needs in policy priority. Nigeria presents an example where rural agricultural activities contribute a sizable percentage to the country's GDP. However, these rural areas have still not been given special attention in terms of rural development projects such as housing, infrastructural development, policy formulations and implementation (Abdullateef*et al.*, 2017). According to the author, agriculture (the primary activity in the rural areas) accounted for about 40% of GDP in 2011. Additionally, rural areas employ around 70% of the Nigerian population, but little seems to have been done to raise the status of these areas and bridge the housing deficit. Improving the quality of needed infrastructure in the rural areas of any country could benefit the country at large.

The key characteristics associated with good rural housing needs, such as water, electricity, toilet facilities, among others, are missing in the developmental efforts of the governments of many developing countries (Tiwari, 2007, Department for International Development (DFID), 2015). The absence of these facilities in most rural areas in Nigeria resulted in severe poverty (Sule*et al*., 2013; Udoh and Uyanga, 2013). In addition, as is the case in India, insufficient access to relevant knowledge and information, poor connectivity to the development process and greater exposure to natural hazards place rural dwellers in a disadvantaged position (India Rural Housing Schemes, 2015). With developing countries like Nigeria sharing seemingly similar attributes, there is the possibility that many rural households will also find it difficult to have sufficient funds to improve their housing conditions, due to low income and seasonal unemployment that plague most rural areas in the country.

There is no doubt that the employment status of most Nigerians in the rural areas, which is largely dependent on subsistence agriculture, has placed rural dwellers in disadvantaged positions (Popoola, 2012; Sule*et al.*, 2013, and Udoh and Uyanga, 2013). Many of them are not sufficiently empowered to provide the required facilities, such as sanitation. These facilities can have a material role in improving dwellers' health and reducing stress. In addition, the time saved could be diverted towards more productive activities, which would lead to improved efficiency in output and, subsequently, their housing conditions.

There is little interest from public authorities and the private sector in embarking on projects in rural areas. Thus, integrated schemes sponsored mainly through non-governmental

organisations in Africa have provided an option by equipping rural dwellers with skills to generate more money for improved livelihood. An integrated development scheme is a process of inducting sustainability in the poor's wellbeing at the post-project period. This is done by assessing the relationship between income generation activities and housing improvement. The primary concern of the scheme is to integrate the people and enable an environment that influences the outcomes of livelihood strategies. This is achieved through formulating development activities that centre on the potential of people, such as their skills, social networks, and access to physical and financial resources. The project has remarkable success in slum upgrading and rural community projects development in India, Kenya, Indonesia and Ethiopia (Majale, 2004; Solomon, 2014).

There are expected and unexpected outcomes from participants and non-participants in any integrated scheme (Ashley and Hussein,2000). Part of the expectation is that the rural dwellers improve their skills and income through the scheme. An improvement in their housing condition is expected to follow. The improvement of rural infrastructure could stimulate economic growth and result in stronger rural economies. This paper, therefore, seeks to examine the potentials of integrated schemes aimed at improving the livelihood of poor farmers (especially women and youths) in Osun State. The Rural Development (RUDEP) project anchored by the Catholic Mission of Osogbo Diocese, Osogbo, Osun State, Nigeria, will be used as a case study. This paper will examine how the skills and assets of the rural dwellers have been improved by the scheme and have seen them improve their housing conditions. The question, therefore, is, 'what is an integrated rural scheme'.

2. Literature Review

The integrated rural scheme is an emerging development approach aimed at revitalising the economic base of the rural economy and improving farming activities in developing countries. The scheme is often designed to improve the economic and social life of the rural poor that seek a livelihood in the rural areas. In an integrated system, it is expected that there should be cooperation between the central authorities and local system to guarantee dwellers access to physical resources, subsidies for payment of local resources, maintenance of public goods, and ensure the protection of rural resources to aid utilisation of rural development process (Serrat, 2017; Nemes, 2005; Kalu et al., 2014). As a result of this system, the resources that remain unexploited can be harnessed by making a substantiate capital value flow into the economic resource base of a local area as well as creating a marketable product by improving the business, economic, social policy access for the benefit of the rural poor in the area.
Serrat (2017) posited that an integrated rural system should comprise the approach that integrates the people and the enabling environment that influences the outcomes of livelihood strategies. This approach could help formulate development activities centred on the potential of people in rural areas. The approach is described as a Sustainable Livelihood Approach (SLA). The approach focuses on their skills, social networks, access to physical and financial resources, and influence on the central and local institutions.

2.1 Sustainable Livelihood Approach (SLA)

SLA is a developmental approach designed with the objective of affordability for a particular target group (Lall, 2002). For instance, in order to ensure that houses are affordable, SLA advocates the use of local raw materials. Additionally, indigenous artisans must be trained to ensure that the completed homes are within a specified budget. It is thus a housing effort,

interpreted in terms of a holistic approach to poverty reduction through shelter and income improvement. It is holistic in the sense that it entails bringing people in specific regions or rural localities together to educate. This education focuses on how their productivity could be enhanced through increased technical knowledge, improved marketing, increased access to loans, and greater awareness of the importance of saving to ensure effective use of the resources in the development process. With enhanced and improved livelihood, rural dwellers are financially empowered to improve their housing conditions.

Sustainability refers to the preservation or improvement of resources productivity on a long-term basis. Chambers (1987) states that while livelihood is sufficient, stocks and flows of food and cash to meet basic human needs. Chambers and Conway (1992), Krantz (2001) and Nemes (2005) described sustainable rural livelihood from a household point of view as the approach that utilised five capital assets, namely: natural, human, social, physical and financial capital. These capitals enhance participants' social and economic capacity, reduce poverty and enhance sustainability in their livelihood. The SLA is an example of the "multiple capitals" approach. In this approach, sustainability is considered in terms of available capital (natural, human, social, physical and financial aspects) and an examination of the vulnerability context (trends, shocks and stresses) in which these assets exist.

Scoones (1998) explained that a sustainable livelihood framework includes three broad divisions of livelihood strategies that comprise varied options accessible to the rural poor. Firstly, the division consists of capital and social-agricultural intensification, income-earning diversification, and voluntary and involuntary movement patterns. Secondly, the study further suggested having accurate information about the connection between the processes. Lastly, diverse strategy combinations are imperative to accessing a sustainable rural livelihood.

Ashley and Carney (1998) and Carney (1999) considered sustainable livelihood as evolving, thinking about interaction with the rural dwellers as a means to support their wellbeing. It also entails considering change events that might be associated with the policies and institutions, external shocks and demographics, environmental, economic and technological trends. The study of Boyd *et al*. (1999)in the agro-pastoralist sector argued that a SLA must incorporate the relationship between wildlife, livestock and people. In addition, the varying options for integrated wildlife and livestock management in the semi-arid range land of eastern Africa must be included. According to Boyd, Blench, Bourn, Drake, and Stevenson (1999), households should be fully involved in the decision-making process about the use of wildlife. This decision includes the allocation of benefits across the components of human wellbeing such as social, capital, economic or physical assets to improve rural livelihoods to contribute to both conservation and development objectives of the sector.

Morse *et al.* (2009) asserted that the appropriate development strategy is the SLA in an integrated scheme. SLA links issues of poverty reduction, sustainability and empowerment processes. In the SLA approach, interventions in the form of training, skill acquisition programmes and provision of farming tools are given to rural dwellers. These efforts empower them to improve their livelihood assets and help them to carry out some developmental activities like improving their housing condition.

Using the Rural Development (RUDEP) project embarked upon by Justice Development and Peacemakers' Centre (JDPC), anchored by the Catholic Mission of Osogbo Diocese, Osogbo, Osun State, Nigeria, as a case study, this study examines the potentials of the capitals. These

capitals are referred to as livelihood assets acquired as a result of the RUDEP intervention of JDPC at improving the livelihood of poor farmers. The beneficiaries are primarily women and youth in the study area. The study further examines their improvement in their housing condition due to the gains from the intervention.

2.2 Review of Past Studies

Different researchers such as Twigg (2001), Majale (2004), Lall and Lall (2006), Yusuf (2010) and Thennakoon (2015) have examined different aspects of integrated rural development schemes. However, the element of development efforts concerning rural areas of developing countries like Nigeria remains unfocused by researchers.

The study of Twigg (2001), using literature search, appraised the suitability of the application of different theories to sustainable livelihoods and vulnerability to disasters. The study examined several issues. For example, the analysis of capacities and vulnerabilities and pressure and release/ access models were examined. In addition, a sustainable livelihoods approach that is relevant to work on livelihood options for disaster risk reduction was also analysed. However, the study by Twigg (2001) only documented the pertinent theories to a sustainable livelihood. It omitted empirical research on the ability of integrated schemes to empower rural dwellers to upgrade their housing conditions.

In 2004, Majale demonstrated the effectiveness of a SLA towards solving the urban slum housing problem and promoting a sustainable shelter delivery strategy for the urban poor in Kenya and India. Lall and Lall (2006) focused on reducing urban poverty and tested the efficacy of linking shelter provision with income-generating activities in Alwar India. The scholars used the SLA. In the study. They found an improved housing condition of the urban poor in India due to the adopted approach (Lall and Lall, 2006). However, there is still the need to conduct a similar study in rural communities like Nigeria with different socio-economic characteristics. The expected result is that the rural development scheme has substantially empowered rural dwellers to improve their housing conditions and provide other rural infrastructure.

Robert (2008), in a study of livelihood strategies for rural development, used the least-squares approach to examine the challenges faced by poor households in Ecuador. The study used income as a parameter to measure wellbeing associated with each livelihood strategy of households in rural Ecuador. The results showed that the ability to combine non-farm activities with farming activities due to the adoption of SLA (was beneficial for the farmers). More so, the experience could lead to higher well-being for most households (in poor urban areas). The current study will extend the discussion by examining the rural areas of Nigeria. The focus is on how the rural dwellers' livelihood and housing conditions have been impacted by development schemes such as SLA.

Morse *et al*. (2009) examined an integrated scheme initiated to boost rural economies in the middle belt of Nigeria using participatory techniques. These techniques were used to characterise, rank and score capital assets of rural livelihood strategies. The authors identified and examined available capital, the vulnerability of this capital and the coping strategy adopted in the representative villages. The study used indicators such as income, expenditure, capital assets in terms of tree crops, food crops, membership of association and hazards. However, the potential of integrated rural development schemes at improving rural housing conditions in

Nigeria through improved livelihood of the people was not examined. Hence, the need for this study.

The study of Yusuf (2010) was limited to gender analysis of livelihood strategies of household heads in rural areas of Osun State, Nigeria. In Fang et al. (2014), an evaluation of the sensitivity of livelihood strategy in China was the focus. Solomon (2014), using a case study, examined the modalities for reducing urban poverty and alleviating the housing problem with an integrated housing development program in Addis Ababa, Ethiopia. Therefore, the current study drew from this theory to examine the benefits of housing conditions that could be enjoyed due to the improved livelihood of rural dwellers resulting from rural development interventions.

In developed countries such as the United States of America and the United Kingdom, Thennakoon (2015) used capital assets and strategies through the assessment of seven core income-generating activities. This data was used to assess the influence of proximity to the city centre on the livelihood of rural dwellers. The findings revealed that the closer the villages were to Colombo Metropolitan Region (CMR), the better their livelihood. However, these findings might be misleading when applied to developing countries like Nigeria, which has different socio-economic conditions. In addition, the study did not include how rural dwellers used the income gained from the rural development intervention to improve their housing conditions. The absence of a study on the potentials of integrated schemes on the housing condition of rural dwellers in African countries such as Nigeria necessitates a study of this nature.

The preceding suggests that studies exist on different aspects of the integrated development schemes in developed and developing countries. However, studies on the ability of rural dwellers to improve their housing conditions given improved livelihood as a result of rural development schemes are scanty, especially in developing countries like Nigeria. This study will bridge the gap in the literature by focusing on the rural development intervention embarked upon by the Justice Development and Peacemakers' Centre in 34 communities of Osun State, Nigeria.

3. Methodology

The study adopted herein combines purposive and stratified sampling methods to collect primary data from household heads participants. To qualify as respondents, the household heads needed to have been part of the rural development scheme that aimed to implement a sustainable livelihood framework. This was the element of interest in this study. In addition, it is believed that the African households focused more on the provision of quality housing and services at determining the wellbeing of the household (Yusuf, 2010). The Rural Development Programme (RUDEP) is a rural intervention unit of the Justice Development and Peace Makers' Centre (JDPMC). The JDPMC is a non-governmental organisation (NGO) that focuses entirely on rural development related issues. RUDEP developed integrated strategies to empower and improve the lives of the rural dwellers holistically by rendering assistance towards increasing and sustaining the productivity of the rural population. Additionally, RUDEP enabled low-income families to improve their living and working conditions within the perspective of self-reliance, self-determination and sustainability. This is done through improved skills and knowledge within some target communities in the Osun state of Nigeria.

The study involved the 36 communities covered by RUDEP as implemented by the JDPMC. It comprises four administrative zones. The study area was stratified into the known administrative zones, which were composed of 28 communities with active participant farmers' cooperative groups, as detailed in Table 1. The four JDPMC administrative zones used for the study were selected because the level of their intervention was considered more intensive than those of any other non-governmental organisation (NGO). More so, preliminary surveys before the main study revealed that only 3% of the participants had contact with one other NGO, hence choosing the JDPMC sponsored communities. To achieve their objective, RUDEP embarked on visits to each group once a month. During these visits, RUDEP taught the rural dwellers new farming and marketing skills; they monitored the farmers' cooperatives organised workshops to introduce new farming skills, among other skills. In addition, the farmers' accommodation types such as 2-4 rooms, 5-6 rooms and 8-9 rooms were obtained during a pilot survey in Osun-state, Nigeria.

Table 1. Distribution of Respondents by Location and Local Government Area

S/No	Administrative Zone	Farmers Group/ Communities	Number of Participants	Number Selected (80%)	Local Government Area
1	Atakumosa	Ifewara	26	21	Atakumosa West
		Iganga	7	6	Atakumosa East
		Iwara	7	6	Atakumosa East
		Iyinta	12	10	Atakumosa East
		Olowu	9	7	Atakumosa East
		AjumobiIgangan	10	8	Atakumosa East
		Oke-Agbede	18	14	Atakumosa East
2	Ijesha	Iwaraja	11	9	Oriade
		Asaobi	10	8	Atakumosa West
		Ido-Ayegunle	8	6	Obokun
		Ila-Ijesha	16	13	Atakumosa West
		Epe	12	10	Atakumosa East
3	Ila	Idi-Odan	40	32	Ifedayo
		Abalagemo	10	8	Ifedayo
		Oke-Ila	10	8	Ifedayo
		AiyetoroOminla	15	12	Ifedayo
		Oyi-Ayegun	36	29	Ifedayo
		Oyi-Araromi	5	4	Ifedayo
4	Osogbo	Ijabe	11	9	OdoOtin
		Abaolota	9	7	Boluwaduro
		Abaolode	20	16	Boluwaduro
		Awosun	27	22	Ife North
		Adejuwon	30	24	Ede North
		Elewure	13	10	Ede South
		Owode	16	13	Ede North
		Oyan	15	12	OdoOtin
		Idominasi	7	6	Obokun
		Imesi-Ile	17	14	Obokun
Total			**427**	**344**	

Source: Adapted from Odebode et al. (2020)

The data were collected from household heads (HH). This data reflected their socio-economic characteristics, acquired livelihood assets and trends in housing conditions from 1996 to 2015. The choice of HH is justified by the notion that these individuals are primarily responsible for the provision of housing in African countries. This perspective is adopted in most integrated studies such as Yusuf (2010). The Priori expectation for this study is that as the rural dwellers improved their skills and incomes through integrated schemes, and as a result, an improvement in their housing condition follows.

A structured questionnaire was used to obtain information from the farmers and supervisors of RUDEP on the modes of intervention. Other data was obtained by asking questions on activities before and after an intervention. For example, assets before and after intervention, conditions of housing accommodation before and after intervention, housing ownership structure before and after an intervention. In addition, benefits derived from membership of RUDEP cooperative association and mode of intervention adopted by RUDEP to manage the negative impact of the hazards experienced by participants were also obtained. The benefits derived from membership from participants' perspectives were to triangulate the farmers' information with the ones obtained through personal observations and interviews from the supervisors of RUDEP. Triangulation is a means of ensuring that there is uniformity in the information received from different respondents on the same project objective in a study. The triangulation is similar to the one adopted in Thennakoon (2015). The aim is to assess the scheme's impact on improving the livelihood of poorer farmers in the study area.

The data collected was analysed through frequency, percentages, and mean to give results that would provide an understanding of whether the sustainable improvements in people's livelihoods have taken place in the study area or not. Out of the 344 respondents selected for the study, 340 (98.8%) were available at the time of data collection in the study area.

4. Results and Discussion

This section presents the results in respect of the characteristics of the respondents and the potentials of integrated rural development schemes at enhancing rural infrastructural development and rural housing conditions in the study area. Table 2 details the results of the characteristics of the respondents.

Table 2: Distribution of Respondents by their Characteristics

Variable	Frequency	Percentage (%)
Household Status		
Household head	273	80.3%
Not Household head	65	19.1%
No response	2	0.6%
Duration of Habitation		
1-5 years	18	5.2%
6-10 years	8	2.4%
11-15 years	14	4%
16-20 years	66	19.4%
25 years and above	234	69%
Size of Land Cultivated in Hectares		
<1	29	8.5%
2-5	162	47.6%
6-10	54	16%
11 and above	63	18.5%
No response	32	9.4%
Structure of Land Ownership		
Family	185	54.4%
Long-lease	73	21.5%
Outright purchase	31	9.1%
Tribute basis	2	0.6%
Instalment	7	2%
No response	42	12.4%
Years of Farming Experience		
1-10	65	19.1%
11-20	71	20.9%
21-30	88	25.9%
Above 31 years	99	29.1%
No response	17	5%
Level of Education		
No formal education	75	22.1%
Adult education	9	2.6%
Primary education	88	25.9%
Secondary education	117	34.4%
Tertiary education	39	11.5%
No response	12	3.5%
Household Size		
≤5	68	20%
6-10	177	52.1%
11 and above	80	23.5%
No Response	15	4.4%

The results in Table 2 show that while 80.3% of the respondents' farmers were HH, the remaining 19.1% were not. In line with the findings by Morse *et al*. (2009), HH is always the point of contact in integrated schemes, and they are traditionally expected to provide housing for their families.

The results in Table 2 show that a majority of about 69% of the respondents had spent over 25 years in each of the villages/settlements of their choice. Moreover, 19.4% had spent between 16 – 20 years of their lives in the study area. Finally, 5.2%, 2.4% and 4% had spent between 1

-5 years, 6 - 10 years and 11 - 15 years of their lives in the study area, respectively. With the majority having more than 25 years' experience of living and working in the community, the possibility of obtaining sufficient data on the intervention for a sufficiently long period of time was guaranteed.

Large landholdings are a prerequisite to commercial farming. As farmers, the majority, 47.6%, cultivated between 2 - 5 hectares of agricultural land.18.5% used over 11 hectares, and 16% used 6 - 10 hectares, while 8.5% of the farmers used less than 1 hectare for farming. Altogether, 34.5% cultivated more than 6 hectares of land while the majority, 47.5%, fell within 2 - 5 hectares. These numbers simply show that most farmers had sufficient land holdings to sustain commercial farming, which development agencies mainly require for an intervention programme. The size of land holdings suggested their possibility of having benefited from a rural intervention programme. Therefore, these farmers were suitable for this research.

4.1 Land Ownership Structure

An enquiry into the land ownership status revealed that most of the farmers' had a reliable title deed to land. Of all the farmers, 54.4% used the family land for their farming activities, while 21.5% got a long lease on their farmlands. A further 9% of the farmers purchased their farmland out-rightly. Lastly, 2% and 0.6% of them obtained their farmland on the condition of paying for it in instalments.

Family land and land purchased out-rightly usually have secured tenure that can support economic trees such as cocoa that needs a long period before it starts yielding fruits. Hence, the fact that most farmers (63.4%)were either using family land or purchased the land outright suggests that such farmlands can sustain different agricultural practices required by development agencies during an intervention. This could explain why planting cash crops and other perennial crops, which earns farmers more income, could be supported with intervention from development agencies. However, non-family-owned lands on lease could not support intervention from development agencies because the tenure is not secured.

4.2 Years of Farming Experience

The participant farmers experience concerning the numbers of years spent in farming could explain the chances of benefitting from rural development schemes. The results show that farmers with over 31 years of farming experience were 29.1%. Those between 21– 30 years of experience were 25.9%, while 20.9% and 19.1% of the farmers had between 11 - 20 years and 1- 10 years of farming experience. With the majority of farmers (55%) having farming experience of over 21 years, the results suggested the possibility of obtaining sufficient and reliable data for this study. It also indicates that most participants could have acquired additional skills that would enhance their livelihood based on the skill acquisition training obtained from years of association with RUDEP.

4.3 Level of Education

The prior education that the farmers had suggests that the farmers are amenable to training and the learning of new things. For example, the responses to the question on the respondents' level of education had shown that 22.1% had no formal education. The remaining 77.9% had tertiary education ranging from National Certificates in Education (NCE), Ordinary National Diplomas

(OND), Higher National Diplomas (HND), to university degree certificates. This means that most farmers had one form of education or another. This level of education coupled with their experience is an advantage on the probable ease to which RUDEP could help educate farmers on best farming practices. The education level could have also aided the farmers in getting the best benefit from the integrated scheme. This aid would come through a quick understanding of the training program, the ability to try new skills/methods, and opportunities for more livelihood combinations to increase their income. The ease of understanding the training programme due to the significant proportion of the educated farmers aligns with the study of Oduro-Ofori*et al*. (2015). Oduro-Ofori*et al*. (2014) opined that in any agricultural, rural development policy, the educational level of farmers is vital to the improvement of agricultural productivity. The authors believe that the level of education of the participants' farmers in the current study would enhance improvement in agricultural productivity. These opportunities would help because they open the farmers' minds to knowledge about changing innovations, ideas, and better farming methods.

4.4 Household Size

Finally, Table 2 reveal that the respondents with a household size of less than or equal to 5 people were 20%. A further 52.1% of the respondents had a household size ranging between 6 and 10 people, while another 23.5% had a household size of more than 11 people. The overall results show that 75.6% of the respondents had a household size of more than six people. More households maintained by a majority of the respondents could be fulfilling the need to have sufficient farm labour to assist for large scale farming purposes which are often required by rural development agencies such as RUDEP.

4.5 Mode of Operation Adopted for Intervention

For triangulation, the respondents were asked to indicate the mode of operation adopted for intervention by RUDEP at improving their livelihood. They were asked to indicate any or a combination of the adopted intervention approach by RUDEP. For example, the form of donation of free improved seedling, financial assistance, education of farmers and giving of technical support. The responses are detailed in Table 3 below.

Table 3: Perception of Respondents on the Mode of Operation Adopted for Intervention

Variable	Frequency	Percentage (%)
Improved seed	7	2%
Financial assistance	7	2%
Education of farmers	200	59%
Technical support	48	14.1%
No Response	78	22.9%

Source: Adapted from Odebode, (2019)

The multiple responses in Table 3 reveal that the majority, 59%, of the respondents indicated that the principal mode of intervention they enjoyed from RUDEP was that they were educated. This new knowledge included the best farming practices such as cocoa spacing, cutting edge of farmlands to control fire hazards, and organic manure to improve productivity. In addition, they were taught how to use weeds to make insecticides for pest control as coping strategies. This education was followed by technical support with a 14% response rate.

The educational training that they received helped them see the value of using more improved seedlings and better cultivation practices. A few others had enjoyed a series of technical support such as providing farm equipment (like harvesters' water pumping machines for vegetable planting irrigation, among others) and implementation often provided by RUDEP to enhance participant's productivity.

The above analyses show that RUDEP's primary mode of operation was to educate farmers on the best farming practices and, thereafter, technical support. The interview conducted with a RUDEP supervisor and personal observation showed that the integrated scheme initiators often offered technical support to participants' farmers. The technical support is via quarterly organised workshops at each zone where farmers could always interact with the guests or RUDEP staff with the requisite technical expertise. The organisation also assisted with arrangements for the supply of water pumping machines to farmers at subsidised rates through collaboration with the Federal Ministry of Agriculture. Other modes of intervention were the provision of improved seed and financial assistance, each with a response rate of 2%. With this, many farmers developed coping strategies via improved skills that enabled them to use weeds to make insecticides for pest control. In addition, they treated their livestock and cut the edges of farmlands to prevent fire hazards during the dry season. These skills increased their efficiency and hence, boosted their productivity and income. This is similar to the capacity and vulnerability analysis by Twigg (2001) and coping strategies adopted by the participants in Morse *et al.* (2009).

4.6 Perception of Farmers on the Benefits of the Integrated Scheme

The farmers' perceptions of the benefits obtained from the integrated schemes were analysed to assess the significance of the schemes to the respondents. To assist farmers in harnessing the internal resources of members, they were encouraged to form cooperative societies and activate the benefits from within their respective societies. This study investigated the benefits enjoyed by members of the RUDEP cooperative society.

Table 4: Respondents' Perception on Benefits Derived from Membership of RUDEP Cooperative Association

Variable	Frequency	Percentage (%)
Increased income	218	64.1%
Improvement in wellbeing	190	55.9%
Increase productivity	168	49.4%
Better access to a loan	170	50%
Low interest on a loan	90	26.5%
Share experience from others	90	26.5%
Better price for produce	68	20%
Better access to inputs, e.g. fertiliser	70	20.6%

*Footnote:*Multiple responses**

Table 4 outlines some of the results of the benefits associated with membership of social organisations. From Table 4 above, we see that the most significant benefit for the majority of the farmers, 64.1%, was an increased income. Table 5 below contains a more detailed collation of the farmer's income increments data. These increments could have resulted from better farming practices such as adequate spacing between cash crops and poultry integration with

cash crops. In addition, their new marketing skills, such as cutting off middlemen to secure fairer prices for their products, led to increased income on their farm produce. Finally, there was improved market access to the local and regional market areas. This is in tandem with the findings by Glatz*et al*. (2005), Morse *et al*. (2009) and Yusuf (2010), who showed that participating in integrated schemes was beneficial. More so, they found that when livestock grazed together in some communities, it enabled the farmers to identify better-coping strategies among representative villages that served as a catalyst to improve the livelihood of the participants.

4.7 Perceptual Growth in Farmers' Income from 2000 to 2015

The respondents were asked to indicate the percentage of the growth they experienced in their income within the period of 2000 and 2015. This was the period within which the rural development intervention took place. Table 5 presents the trends in respondents' income during the period studied. This data was used to evaluate the respondents' income improvement after the intervention.

Table 5: Percentage Growth in Farmers' Incomes

Income	2000-2003	2004-2007	2008-2011	2012-2015
<10,000	45.9%	40.1%	33.9%	11.7%
10,001-100,000	32.6%	35.6%	38.3%	41.6%
100,001-1,000,000	19.4%	21.2%	22.3%	36.9%
1,000,000 and above	2.1%	3.1%	5.5%	9.8%

The findings show that an increase in income experienced by the farmers within the periods between 2012 and 2015 took place simultaneously as the RUDEP intervention. The percentage of those who earned N1,000,000 and above increased to 9.8%. Those who earned between N100,000 and N1,000,000 rose to 36.9%. At the same time, the percentage of people who earned N10,000 to N1,000,000 reduced drastically to 11.7%. The reduction recorded in the percentage of farmers that earned N10,000 to N1,000,000 within the periods was that farmers increased their farming activities by integrating poultry into a crops and pasture farming system. As a result, the farmer's scale of operations went beyond the farming spacing provided for the periods.

The expansion of the scale of operation of the farmers could be attributed to the positive contribution of the RUDEP intervention by enhancing rural farmers to diversify and grow in size and productivity. Additionally, the consistent growth and rise in the percentage of the people who earned more is an indication of the positive contribution of the RUDEP programme on the increased income of the respondents; this is shown in Table 4. Additional skills and assets acquired could enhance the participants' ability to try different combinations of livelihood strategies that could boost their income, which agrees with the study by Fang *et al.* (2013) and Galadima (2014). The scholars note that the provision of basic infrastructure for rural poverty reduction through a community development approach is alleviated through sustained increases in the productivity and incomes of rural farmers and households.

Table 6 presents the assets obtained by the respondents before and after RUDEP's intervention. It was used to determine additional assets acquired by the respondents after the RUDEP intervention.

Table 6: Asset Before and After RUDEP Intervention

Variable	Frequency Before	Frequency After	Percentage Before (%)	Percentage After (%)	Percentage Increase or Decrease in Asset (%)
House	116	145	34.1%	42.7%	8.6%
Farmland/ Land	71	82	21%	24.1%	3.1%
Car	2	9	0.6%	2.6%	2%
Motorcycle	24	22	7%	6.5%	-0.5%
Grinding Machine	7	12	2%	3.5%	1.5%
Generator	2	58	0.6%	17.1%	16.5%
No Response	118	---	---	---	---
Total	**340**	**328**	**65.3%**	**96.5%**	**31.2%**

*Source: Adapted from Odebode (2019) Footnote:*Multiple response**

The results in Table 6 reflect multiple responses and include more than one response per participant. When it came to assets acquired by the farmers, there was a total increase from about 222 to 328 in the number of assets owned after the introduction of the RUDEP programmes. The increase in assets acquired indicates that the increase in the farming scale of operations, obtaining a fairer price for market products, improved marketing skills and market access, access to farming tools, training and other assistance leads to farming productivity. Consequently, it implies that there is a high tendency that the RUDEP integrated scheme is responsible for a positive impact on asset acquisition of respondents because the participants stand out in asset acquisition in the study area. This is in agreement with the finding of Majale (2004) and Lall and Lall (2006) that increased income could lead to the acquisition of other livelihood assets. Also, Pouw and Elbers (2014), Shi *et al*. (2014) and Liu *et al*. (2018) asserted that physical assets, staffing assets and financial assets have a significant positive influence on farm households' choices of livelihood strategies. This is done in achieving livelihood goals. for instance, livelihood goals include increasing production activities, changes in land use, and household livelihood assets acquisition.

4.8 Effects of the Integrated Scheme on Housing Condition

Unexpected benefits abound from the expected gains and benefits of integrated schemes. One of these (un)expected benefits was the use of the increased income from livelihood to improve their housing conditions. The unexpected results of recent research on the impacts of integrated schemes in 28 selected villages revealed the significance of the schemes to the improvement of housing conditions. The study evaluated the growth percentage or increase of people who upgraded their housing conditions. More so, these also added to their housing units due to the gains from the integrated schemes.

Table 7: Increase in Housing Assets

State of Accommodation	2000-2003	2004-2007	2008-2011	2012-2015
No personal accommodation	15.9%	12.7%	10.6%	8.5%
2-4 rooms	24.7%	26.2%	26.8%	28.5%
5-6 rooms	24.4%	26.1%	27.1%	27.1%
8-9 rooms	35%	35%	35.5%	35.9%
Total	**100%**	**100%**	**100%**	**100%**

The results in Table 7 above reveal that there were increases in homeownership in the period between 2000-2015. The respondents without any personal housing assets decreased from 15.9% within the period between the year 2000 – 2003 to 8.5% for the period between the years 2012 – 2015. The increase in homeownership after the intervention could be linked to the increased income from the intervention, as found earlier. There was an increasing trend in the acquisition of various apartments ranging from between 2-4 rooms, 5-6 rooms and 8-9 rooms among participants. The accommodation types in the study are ascertained through a pilot survey as stated in the methodology. The above findings could be due to additional farmland acquired after the intervention, enabling the participant to plant more crops to increase productivity and income.

In addition, the results from the personal observations and focus group discussions further revealed that the farmers engaged in other high income yielding ventures such as apiculture, aquaculture and poultry farming as a result of the intervention introduced by RUDEP. They also benefited from the introduction of improved seeds and the availability of mechanical water pumps to plant pepper and vegetables, among others. The use of the pumps meant that they could grow crops throughout the year, which boosted income. The direct result was increased revenue, improved well-being, and increased productivity. The indirect results were better access to loans that could be used for housing improvement and acquiring more assets. This was in tandem with Majale (2004) and DFID (2015) findings that showed that the increased income of households in farming communities empowered them to provide some facilities on their own and led to significant investments in housing.

4.9 Facilities Provided by Respondents themselves After the Intervention

The respondents were asked about the facilities provided in their various houses during the period studied. This was to determine their access to different domestic housing facilities. The results of the analysis are shown in Table 8.

Table 8: Distribution of Respondents According to Access to Domestic Housing Facilities

Access to Domestic Facilities	2000-2003	2004-2007	2008-2011	2012-2015
Well	6.2%	4.4%	5.6%	7.7%
Borehole	2.1%	0.3%	0.6%	1.8%
Pit-Toilet	10.9%	5.6%	5.9%	11%
Semi Pit-Toilet	0.3%	-	-	0.6%
Water Closet	2.7%	1.8%	2.1%	2.7%
Electricity supply	13.8%	9.1%	9.4%	16.8%
Generator	1.5%	0.3%	0.6%	2.7%
Total	**37.5%**	**21.5%**	**24.2 %**	**43.3 %**

*Footnote: *Multiple responses *Pit/Semi-Pit Toilet and Water closet (N=114) *PHCN and Generator (N=167) *Well and Borehole (N=81)*

The results in Table 8 reveal that the respondents who connected their houses to the leading electrical supplier, Power Holding Company of Nigeria (PHCN), were more than those using generators. The increased acquisition of generators in the period between 2012-2015 could be due to an increase in purchasing power generated by improvement in financial capital assets due to the integrated scheme. This is in agreement with Majale (2004) finding, which illustrated that increased income leads to an enhanced quality of life. In addition, these domestic facilities such as electricity, portable water and hygienic toilet facilities can increase the health quality of participants. As a result, increase their productivity and income. This is in agreement with the DFID (2015), which opined that better domestic infrastructure is usually a core component of wellbeing. Suleet al. (2013) and Udoh and Uyanga (2013) also stated that the facilities mentioned above are lacking in most rural areas in Nigeria.

Moreover, the results in Table 8 show that 10.9% and 5.6% of respondents were using pit toilets between 2000-2003 and 2004-2007, respectively. These numbers simply show that the respondents who had toilet facilities during these initial periods of the RUPEP integrated scheme had only been using pit toilets. Finally, in the period between 2012-2015, 11% of the respondents were able to provide pit toilets for themselves while 4.8% built water closets for their use. This shows that there was an increase in the number of respondents with toilet facilities after the RUDEP intervention. Though most of the respondents still used pit toilets in the study area, few others were able to provide water closets for their use. This is an indication that there was both quantitative and qualitative improvement in toilet facilities among the respondents.

Finally, Table 8 reveals a notable increase in access to potable water among the respondents. There were higher numbers of wells than boreholes after the intervention. This implies a consistent rise in the number of respondents that could afford the provision of a well. Conversely, the respondents who could afford to pay boreholes were as low as 1.1%, 1.3%, and 1.8% for 2000-2003, 2008-2011 and 2012-2015, respectively. , Additionally, during the fieldwork, the authors observed that some of the respondents engaged in suitable constructions within the study area. The results show that there was an increase in the availability of portable water after the RUDEP intervention. The increased availability of portable water and toilets in

rural areas could lead to better health conditions and increase the productivity of rural dwellers. This is in tandem with the findings by DFID (2015), which indicated that part of the increased income from integrated schemes was most often invested in housing facilities such as water, toilet and electricity.

5. Conclusion

This study examined the potential of the RUDEP integrated scheme in improving the livelihoods and housing conditions of rural dwellers. The findings revealed an increase in the number of respondents with private accommodation after the RUDEP intervention. Moreover, most respondents had increased access to domestic housing facilities such as water wells, pit toilets and electricity. Furthermore, based on perceptual analysis, many respondents enjoyed increased income, productivity, and better loan access via farmers' cooperatives. The access to loans enhanced their livelihoods as they had more capacity to generate higher income and were thus able to improve their housing conditions.

In addition, the trend analysis revealed an increasing trend in the respondents' income during the period studied. Hence, the paper concluded that integrated schemes could be used as a self-financing strategy for qualitative and quantitative rural housing improvement in Nigeria. The study, therefore, posits that integrated housing schemes could be a strategic option for improving rural housing conditions in Nigeria.

Moreover, the case study for this research, the RUDEP integrated scheme, could have had a more significant impact on the lives of all the participants. Additionally, it could have had a more expansive coverage if all tiers of government in the country gave it the much needed financial and human resource boost. Whereas the case study was not primarily focused on rural housing improvement as its objective, the improved livelihood/income impacts the improving housing conditions of rural dwellers. Finally, the study opined that an integrated scheme designed to improve rural infrastructure and housing could significantly impact rural infrastructure and participants' housing needs.

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Gender, Socio-Economic and Socio-Cultural Correlates of Entrepreneurial Intentions of Real Estate Students: An Empirical Analysis

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Abstract

Extant studies have revealed conflicting outcomes regarding gender-based differences in students' entrepreneurial intentions. In Nigeria, the real estate business environment tends to be male-dominated, suggesting significant differences in the entrepreneurial intentions of men and women. This paper studies the intentions of real estate students at three Nigerian universities in order to better understand the barriers and supporters that shape students' entrepreneurial intentions. In doing so, the paper aims to show how gendered differences may shape students' entrepreneurial aspirations in Nigeria. Primary data were collected using closed-ended questionnaires administered to final year real estate students from Obafemi Awolowo University, Ile-Ife; Federal University of Technology. Akure; and the University of Lagos. The study adopted an independent sample t-test and principal component analysis (P.C.A.) to analyse the data collected. The study revealed that whilst both genders were motivated by financial factors, an examination of the barriers showed that support system/marketability skill and market environment/support system were obstacles to the entrepreneurial intentions of the male and female students.

The findings show that there are gender-based differences in the entrepreneurial aspirations of real estate students in Nigeria, especially as it relates to the market environment/support system and cultural practices. Additionally, as noted by either of the genders, the challenge of finance had significant implications for the realisation of entrepreneurship intentions. Finance will influence the nature and scope of the real estate enterprise to be considered by the students.

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Keywords: gender differences; entrepreneurial intentions; real estate students; real estate business; Nigeria

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1. Introduction

Entrepreneurship and its incorporation into the undergraduate curriculum of tertiary institutions is a critical element in addressing issues relating to economic growth and unemployment (Neneh, 2014; Iwu et al., 2016). Thus, understanding students' entrepreneurial intentions before graduation are vital to supporting them. While the potential of students' entrepreneurial intention in predicting entrepreneurial behaviour and attitude has been documented in the literature (see, for example, Sanchez & Licciardello, 2012; Ojewunmi et al., 2018; Mary-Joan et al., 2019), the role of gender differences in influencing enterprise creation is yet to be holistically understood. Evidence in the literature suggests that entrepreneurship is a male-dominated area (Crant, 1996; Lo, Sun & Law, 2012; Hundera et al., 2019). While a recent report by the Global Entrepreneurship Monitor (G.E.M.) (2019) documented evidence of lower levels of female entrepreneurship in many countries, The submissions of extant studies regarding gender variation in students' entrepreneurial intentions have yielded varying evidence across disciplines and climes.

Moreover, most of these studies were generally focused on disciplines such as management, manufacturing and engineering. Little is known about the gender variation in the entrepreneurial intention of real estate students, despite the increased recognition of the real estate sector as an essential contributor to economic growth (Hamzah et al., 2016). In the real estate industry, gender-based disparities are evidenced by the dominance of men in the real estate business and markets. As observed by studies such as Pauli (2013), Warren and Antoniades (2016), Pauli, Kristoferson and Stevenson (2020), amongst others, the global real estate industry is male-dominated. This reveals likely differences in the intentions of either gender in setting up a real estate enterprise.

Given that the career perceptions, goals and enterprise motivating factors vary between males and females, there are likely to be variations in the entrepreneurial intention of both genders too. Thus, gender variability in the real estate sector could be further explained by assessing the entrepreneurial intentions of real estate students. Literature suggests that entrepreneurial intention is best measured at the undergraduate level before graduation (Lo, Sun & Law., 2012; Shinnar et al., 2018). Yet, the influence of gender on entrepreneurial intention in the real estate sector has not been extensively examined, underscoring the need for a deeper understanding of the gender variations in entrepreneurial intentions.

In Nigeria, while studies such as Ishaya, Makama and Sabo (2011) and Oluwunmi et al. (2017) have identified the pervasiveness of gender discrimination in the real estate industry, little is known about the gender disparity in terms of the entrepreneurial intentions of real estate students. Given the male-dominated nature of the real estate market and, most importantly, the entrenched patriarchal nature of most African societies (Eresia-Eke & Gunda, 2015), a study of this nature is essential. Apart from exploring the role of gender-specific aspects in the formation of real estate students' entrepreneurial intentions, it also provides a better understanding of gender disparity in the creation of real estate enterprises. This study,

therefore, seeks to investigate the gender variations in the entrepreneurial intentions of real estate students in Nigeria. Drawing on results from in-depth survey research conducted on final year real estate students across three major universities in Nigeria, we seek to unravel the dimension of gender disparity in students' entrepreneurial intentions.

The following section situates this enquiry within extant global and continental literature on gender differences in entrepreneurial intention. Thereafter, a discussion of the research methods employed for the study is provided, followed by an analysis of the respondents' profiles, views, perceptions, and motivations, which inform the conclusions and inferences drawn from the study.

2. Literature Review

The review of literature is divided into two parts. The first explains the concept of entrepreneurship and its connection with entrepreneurial intention. The second part focuses on the predictors of students' entrepreneurial intention.

2.1 Entrepreneurship and Entrepreneurial Intention

The term entrepreneurship has been a subject of varying interpretations and descriptions. Hence, numerous definitions of entrepreneurship exist in the literature. However, there is consensus on the potential of entrepreneurship in reducing the incidence of unemployment, most especially in developing countries (Sanchez & Licciardello, 2012; Ojewunmi et al., 2018; Mary-Joan et al., 2019). According to Kirzner (1979), an entrepreneur is someone who embraces the responsibility and opportunity for a business operation in anticipation of future benefit. Thus, entrepreneurship entails recognising and initiating activities geared towards establishing a business enterprise. Moreso, Shane and Venkataraman (2000) described entrepreneurship as the process of identifying the sources of opportunities. As such, an individual's recognition of opportunity and the ability to transform ideas into reality is the critical fundamental indicator of an entrepreneurial attribute (Hamzah et al., 2016). As a psychological construct, the intention has been recognised as the best predictor of behaviour, which predicts the process of venture creation (Kruegger, Reilly & Carsrud, 2000). Thus, the decision to venture into a new area is dependent on intention. Since the intention is recognised as an antecedent of action (Ajzen, 1991), it follows, therefore, that entrepreneurship is an intentional activity.

In this regard, Bird (1988) described entrepreneurship as planned and intentional behaviour towards creating new ventures. Hence, entrepreneurial intention is a predictor of entrepreneurial behaviour and activity (Krueger et al., 2000). According to Bird (1988), the entrepreneurial intention could be described as a state of mind that influences individuals' actions towards developing and implementing new business ideas. Similarly, Shinnar et al. (2018) see it as the intention of a person to create a new enterprise or action. The intention to create an enterprise before the eventual implementation underpins entrepreneurship issues and the potential for entrepreneurial intention is best formulated and shaped while still in universities (Lo *et al*., 2012). The preceding suggests that entrepreneurial exposure at the institutions of higher learning could help shape students' intentions toward creating a business enterprise. However, extant studies have submitted that there are other determinants of students' entrepreneurial intention.

2.2 Predictors of Students' Entrepreneurial Intention

The formation of entrepreneurial inclinations has been attributed to the influence of a variety of factors that stimulate attitudes and behaviours towards the creation of business enterprise. According to Azjen (1991), the intention to demonstrate a particular behaviour is fashioned by several cognitive factors such as needs, values, wants, habits and beliefs. Premised on the theory of planned behaviour, Azjen (1991) averred that attitudes toward entrepreneurial behaviour, social norms, individuals' perception of their instinct and ability to undertake entrepreneurial activity are predictors of entrepreneurial intentions. Several studies (Kruegger *et al*., 2000; Lo *et al*., 2012; Pauceanu *et al*., 2019) have applied and expanded Azjen's theory of planned behaviour in explaining the predictors of entrepreneurial behaviour. For instance, studies such as Camelo-Ordaz *et al*. (2016) and Iwu *et al*. (2016) observed that social factors moderating the social environment in which an individual's intention is formed a significant predictor of entrepreneurial dispositions. The consensus of these studies is that since the thought processes, which reflect the state of mind, stimulate intention and behaviour, then the social environment in which the thoughts are formulated provides direction and guidance for the initiation of the cognitive process resulting in the formation of entrepreneurial intention. Thus, apart from attitudes and behaviour, entrepreneurial intention is determined by numerous factors, summarised under four key headings: demographic characteristics, entrepreneurial education, social and cultural factors, and external support system.

One of the most prominent demographic predictors of entrepreneurial intention is gender. Anecdotal evidence in the literature suggests that the entrepreneurial inclination varies between male and female students. Although the findings have been mixed, the evidence in the literature indicates that male students exhibit greater entrepreneurial intentions than their female counterparts. According to Lo et al. (2012), the variations in the entrepreneurial intentions of male and female students could be ascribed to the differences in perceived opportunities. Female students displayed a lower perception of career progression compared with their male counterparts. Besides, age is also a significant determinant of entrepreneurial intentions. Several studies, such as Autio et al. (2001), Ramoni (2015) and Ayodele et al. (2020), have established a positive relationship between age and enterprise creation intention. This indicates that the age of individuals could stimulate business creation intentions. The entrepreneurial career path is also influenced by parental/family background. Extant literature affirms that an individuals' family and parental background significantly predicts their entrepreneurial behaviour. Ambad and Demit (2016) document the role of family and friends in giving moral encouragement as they provide the necessary information, guidance and motivation to foster students' entrepreneurial drive. Variables such as parental socio-economic attributes, including the level of education, income status, occupation, and the entrepreneurial background of parents, stimulate the formation of entrepreneurial intentions. For instance, Ohanu and Ogbunaya (2018) argued that since parents' occupation is the first occupation most children become familiar with, parental occupation significantly influences their career path. Similarly, parents with higher levels of income have been found to offer the required financial support and start-up capital to support the entrepreneurial intentions of their children. Besides, students from educated and business-oriented families have exhibited high entrepreneurial inclinations due to the moderating effect of their parental backgrounds (Dominic & Murugesan, 2013).

The unavailability and lack of access to financial support and start-up capital are some of the main factors hindering the creation of new businesses (Ramoni, 2015). In most developing

countries, studies such as Iwu et al. (2015) contend that the absence of a financial support system is the most critical driver of a low entrepreneurial drive. Thus, the external support obtained from the public and private non-governmental agencies in the form of loans, technical and advisory support, training, tax incentives, businesses promotions, marketing, among others, could stimulate the formation of entrepreneurial intentions as well as provide an opportunity for nascent entrepreneurs to finance new businesses.

The extant literature provides evidence of the significant role of culture in influencing entrepreneurial decisions (Chukwuma-Nwuba, 2018). Thus, cultural beliefs and societal norms are critical to the formation of entrepreneurial intentions. According to Kruegger (2007), the social environment formed by the intention is a vital antecedent of an individual's thoughts and attitude. Besides, societal norms and cultural beliefs are the key indicators of the social environment. It follows, therefore, that culture is a critical factor that can promote and nurture the creation of an entrepreneurial mindset.

The preceding reveals a substantial gap in real estate literature. While these moderating effects could serve as barriers or motivators to the formation of students' entrepreneurial intentions, the results are likely to vary across climes. The variation across countries owes to the peculiar characteristics, cultural beliefs and socio-economic dynamism. Besides, the variation in the levels of economic development, family support systems and stratification, employment and income status would produce differing outcomes in influencing entrepreneurial intention. Meanwhile, given the gender-biased nature of the real estate industry, typically characterised by male domination, it might be expected that there would be significantly different perceptions of these barriers and motivators across gender, especially in an emerging market like Nigeria. Existing Nigerian studies have dwelt mainly on documenting the prevalence of gender discrimination in the real estate industry rather than exploring students' entrepreneurial intentions. Thus, given that investigations into the gender (dis)alignment of real estate students' entrepreneurial intentions, especially in emerging markets, have been scanty, this study investigates the gender-based determinants of real estate students' entrepreneurial intentions.

3. Methodology

The study population consists of all final year real estate students in the three universities in Southwestern Nigeria offering real estate, namely: Obafemi Awolowo University, Ile-Ife; Federal University of Technology, Akure; and the University of Lagos. Being a professional discipline, the final year students are judged to be the most appropriate class of students, having acquired significant training and knowledge of the real estate profession. More so, the students have been exposed to the basic requirements of a real estate enterprise and the inherent benefits and challenges during the mandatory students' industrial work experience scheme (SIWES). It is expected that the influence of the academic training and SIWES will influence the students' decision either toward real estate enterprise or paid employment.

Primary data were collected using closed-ended questionnaires administered to the students. With a total of 66 final year students at Obafemi Awolowo University, 89 at Federal University of Technology Akure, and 76 at the University of Lagos, the study adopted a total enumeration of all the 231 final year students in the three institutions. The decision to adopt full enumeration follows from the submission of Watson (2001), who stated that for a population above 100, a minimum of 50% would represent the population. The study achieved a retrieval rate of 69.26% (n = 160); 55 from Obafemi Awolowo University, 64 from Federal University of Technology

Akure, and 41 University of Lagos. While similar studies, such as Ayodele et al. (2017), reported a response rate of about 80% from similar respondents, the limited time during which the survey was conducted impacted the response rate. However, the response rate of approximately 70% could still be judged acceptable. All responses were obtained from a field survey conducted in September 2019. The questionnaires included questions relating to demographic characteristics of the students, such as age, gender and parents' occupation. The questionnaire also assessed the students' intention for real estate entrepreneurship using a five-point Likert scale ranging from certainly never (1) to certainly (5). Finally, the survey assessed the students' perceptions regarding the motivations and barriers to their entrepreneurial intentions. The students rated the level of influence of the perceived motivations and inhibitors on a 5-point Likert scale ranging from extremely uninfluential (1) to very influential (5). The factors (motivators and challenges) were extracted from literature sources and pilot interviews conducted among final year real estate students and faculties in one of the universities (see Tables 1 and 2). While the factors identified from the literature were generic, the authors' contextualised the variables into real estate entrepreneurship statements.

Table 1. Real Estate Entrepreneurial Motivators

Motivating Factors	**Sources**
Financial Security	
To have job security	Iwu et al. (2016), Fatoki (2010)
To take advantage of opportunities in the market	
To take advantage of my innate business talent	
Good economic environment	
I enjoy taking risks and investing	
To have financial freedom and independence	
Possibility of attaining higher income	
Ability to measure the direct output of investments	
The real estate business has the potential to make me rich	
Flexibility	
To be my own boss	Chengalvala and Rentala (2017), Iwu et al. (2016), Ozaralli and Rivenburgh (2016), Fatoki (2010)
For my personal freedom/flexible working time	
To challenge me	
Desire for independence	
Ability to choose own work task	
Preference for varied and non-repetitive tasks	
I can cope with job demands required in the real estate business/practice	
Mentorship	
For my own satisfaction and growth	Chengalvala and Rentala (2017), Iwu et al. (2016), Ozaralli and Rivenburgh (2016), Fatoki (2010)
To realise my dream	
To sustain the entrepreneurial family culture	
Increase my prestige and status	
Personal fulfilment	
To take advantage of my education and training	
Personal Satisfaction and Prestige	
To provide employment	Wood *et al.* (2013), Fatoki (2010)
To provide support for younger real estate entrepreneurs	
Desire to follow the example of my role model(s)	
Helping others fulfil their dreams/desires regarding housing/shelter	
I enjoy motivating others	

Table 2. Real Estate Entrepreneurial Challenges

Inhibiting Factors	**Sources**
Market Environment	
Lack of real estate business experience	Chengalvala and Rentala (2017), Iwu *et al.* (2016)
Future uncertainty about the local market	
Weak economic environment	
Support System	
Lack of support from family and/or friends	Chengalvala and Rentala (2017), Iwu et al (2016), Fatoki (2010)
Lack of support from real estate business mentors	
Difficulty in convincing about real estate business idea	
Difficult to find the right partners to start a real estate business	
Finance	
Lack of personal savings	Chengalvala and Rentala (2017), Iwu et al. (2016), Wood *et al.* (2013), Fatoki (2010),
Difficulty in obtaining bank finance for start-up	
Lack of assets for collateral	
Lack of real estate business skills (financial, marketing)	
Registration / Information	
Lack of information about how to start a real estate business	*Extracted based on interviews with faculties and students*
Lack of information about any government agency that can assist in funding real estate business	
High cost of business registration	
The rigorous registration process with the professional bodies	
Personal Risk Perception	
The risk in real estate practice is too much to allow me to engage in the practice	Chengalvala and Rentala (2017), Ozaralli *et al.* (2016), Fatoki (2010)
Fear of business failure	
The risk involved does not match the time and effort	
Socio-Cultural Influences	
Cultural barriers to starting a real estate business	Hundera et al. (2019), Anambane and Adom (2018), Shelton (2008)
Perceived discrimination against female entrepreneurs	

The data obtained through the survey was analysed using frequencies, percentages, means, independent sample t-test and principal component analysis. The Principal Component Analysis (P.C.A.) was employed to identify the critical components influencing students' entrepreneurial intentions. To determine the suitability of the data for P.C.A., the adequacy of the data loaded for the study was tested using the Kaiser-Meyer-Olkin (K.M.O.) and Bartlett's test of sphericity. For the data to be suitable for the analysis, the K.M.O. is expected to exceed the 0.6 minimum threshold and an amount lower than the 0.05 significance level for Bartlett's test of sphericity (Pallant, 2010). For the P.C.A., the study adopted a 0.50 (50%) loading cut-off mark having an overlapping variance of 30%. The P.C.A. was done using the Varimax rotation method with Kaiser Normalisation.

4. Results and Discussion

The findings are discussed in four subsections. The first examines the demographic profile, and the second analyses the students' entrepreneurial intentions. While the third presents the mean ranking of the obstacles and motivators towards entrepreneurship, the fourth examines the findings using the P.C.A. as a dimension reduction tool.

4.1 Demographic Profile of Respondents

The analysis results on respondents' demographic profiles, as shown in Table 3, reveal that out of the total response of 160, 93 (58.1%) were male, while 67 (41.9%) were female. Further, 69.9% of males and 86.6% of females were between 21 and 25 years old. Overall, 95.7% were aged between 21 and 30 years. The findings also revealed that while 91.4% of the males were single, all of the female respondents (100%) were single. The profile of the respondents presents an active group whose focus will be getting a means of income upon graduation. It might thus be expected that paid employment or self-employment issues will be the paramount consideration for the students, more so being in the final year of their academic program.

Table 3: Demographic Profile of Respondents

Demographics		**Males (n = 93; 58.1%)**		**Females (n = 67; 41.9%)**		**Overall (n= 160; 100%)**	
		Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Age	20 years and below	3	3.2	1	1.5	4	2.5
	21-25	65	69.9	58	86.6	123	76.9
	26-30	23	24.7	7	10.4	30	18.8
	31 and above	2	2.2	1	1.5	3	1.9
Marital status	Single	85	91.4	67	100.0	152	95.0
	Married	7	7.5	-	-	7	4.4
	No response	1	1.1	-	-	1	0.6
Father's Educational Background	No formal education	2	2.2	1	1.5	3	1.9
	First School Leaving Certificate	11	11.8	6	9.0	17	10.6
	Senior Secondary Certificate Examination	4	4.3	7	10.4	11	6.9
	Vocational/Technical	7	7.5	10	14.9	17	10.6
	National Certificate Examination/National Diploma	6	6.5	6	9.0	12	7.5
	Higher National Diploma/Bachelor's Degree	49	52.7	24	35.8	73	45.6
	Master's Degree/Doctor of Philosophy	12	12.9	13	19.4	25	15.6
	No response	2	2.2	-	-	2	1.3
Mother's Educational Background	No formal education	4	4.3	2	3.0	6	3.8
	First School Leaving Certificate	16	17.2	8	11.9	24	15.0
	Senior Secondary Certificate Examination	9	9.7	8	11.9	17	10.6
	Vocational/Technical	6	6.5	4	6.0	10	6.3
	National Certificate Examination/National Diploma	21	22.6	14	20.9	35	21.9
	Higher National Diploma/Bachelor's Degree	32	34.4	27	40.3	59	36.9
	Master's Degree/Doctor of Philosophy	4	4.3	4	6.0	8	5.0
	No response	1	1.1	-	-	1	0.6
	Self-employed/Business	48	51.6	34	50.7	82	51.3

Father's Occupation	Public sector employee	23	24.7	14	20.9	37	23.1
	Private Sector Employee	5	5.4	5	7.5	10	6.3
	Retired	14	15.1	13	19.4	27	16.9
	No response	3	3.2	1	1.5	4	2.5
Mother's Occupation	Self-employed/Business	47	50.5	35	52.2	82	51.3
	Public sector employee	29	31.2	21	31.3	50	31.3
	Private Sector Employee	6	6.5	4	6.0	10	6.3
	Retired	9	9.7	7	10.4	16	10.0
	No response	2	2.2	-	-	2	1.3
Family Status	Low Income	8	8.6	2	3.0	10	6.3
	Middle Income	77	82.8	59	88.1	136	85.0
	High Income	6	6.5	4	6.0	10	6.3
	No response	2	2.2	2	3.0	4	2.5
Mode of Admission	Direct Entry (DE)	21	22.6	23	34.3	44	27.5
	Unified Tertiary Matriculation Examinations	70	75.3	44	65.7	114	71.2
	No response	2	2.2	-	-	2	1.3

Studies such as Nguyen (2018) have submitted that family background and occupation could motivate entrepreneurship. Thus, the study also examined respondents' parental backgrounds. The results show that only a few (2.2% of males and 1.5% of females) had fathers who had no formal education. The majority of the respondents (65.6% males and 55.2% females) had fathers who had at least a first-degree qualification. Comparing the mothers' educational backgrounds, the results showed a slight increase in respondents whose mothers had no formal education (4.3% males and 3.0% females). As a result of this, there was a decline in the percentage of mothers who had at least a first degree. Only 38.7% of the males and 46.3% of the females had mothers with a first-degree qualification. Given the parents' educational qualifications, it might be expected that informed decisions could be made regarding the entrepreneurial choice of the students.

Examining the parents' occupation shows an almost even number of fathers and mothers who are self-employed businesspersons. The males had 51.6% of fathers and 50.5% of mothers who were in business/self-employed, while the females had 50.7% of fathers and 52.2% of mothers in the same category. This might be expected to significantly influence the students' entrepreneurial interest, as parental roles can strongly influence future intentions. Crant (1996) noted that entrepreneurial family background influences entrepreneurial intent. Furthermore, 82.8% and 88.1% of males and females indicated that their families were of middle-income status. The results show that only a few of the respondents are from high-income families (6.3%). Given the importance of start-up finance and the level of family income of most respondents, several respondents might consider start-up finance a significant constraint on their entrepreneurial intentions.

The responses relating to the respondents' academic profiles showed that 75.3% of males and 65.7% of females were admitted through the Unified Tertiary Matriculation Examinations (UTME), a nationally coordinated matriculation examination in the university. Ayodele (2019) submitted that students admitted through this mode were mainly not interested in the real estate profession. They mostly got to study the course due to their inability to get into their first choice degree programme. The initial lack of interest significantly influences the students' perception about developing a lifelong career in the field of real estate, and this could also be a significant factor affecting the respondents' real estate entrepreneurial intentions. On the contrary, 27.5% of students were admitted having obtained additional qualifications: a diploma certificate.

Ayodele (2019) noted that the students admitted through this mode were primarily interested in the profession as they have gone through a two-year diploma program in a relevant discipline in the built environment. This class of students might have a higher level of interest in real estate entrepreneurship.

4.2 Intentions for Real Estate Entrepreneurship

Having analysed the respondents' demographic profiles, the analysis of the respondents' intention regarding real estate entrepreneurship was explored. While studies such as Goyanes (2015) and Nguyen (2018) found that female students are less likely to be entrepreneurially oriented than their male counterparts, this study asserts the contrary. The results in Table 4 showed that females expressed a marginally higher level of intention for real estate entrepreneurship (mean = 3.87) than the males (mean = 3.78), with a mean difference (M.D.) of -0.081. An examination of the statistical significance of this result shows that there is no significant difference between the males and females intention for entrepreneurship (p = 0.583). The statistical insignificance might suggest that the marginal mean difference in the entrepreneurial intentions might be a product of chance. Osakede et al. (2017), examining the entrepreneurial preferences of Nigerian undergraduate students, found similar results showing no statistical difference between the entrepreneurial intentions of men and women.

Table 4: Intentions of Starting a Real Estate Business

Scale	Males		Females		Overall	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Certainly Never	5	5.4	1	1.5	6	3.8
Never	3	3.2	2	3.0	5	3.1
Indifferent	25	26.9	14	20.9	39	24.4
Most likely	34	36.6	38	56.7	72	45.0
Certainly	26	28.0	12	17.9	38	23.8
Total	93	100.0	67	100.0	160	100.0
Mean	3.78		3.87		3.82	
Std. Dev.	1.062		0.796		0.957	
Independent Sample t-test						
t = -0.550			p = 0.583		Mean Difference (MD) = -0.081	

The overall mean rating of 3.82 on a 5-point Likert scale suggests that there is a good measure of intentions by the students concerning starting a real estate business. A probable reason for this is the professional nature of the real estate discipline and the increasing business opportunities being presented in the real estate sector, especially in an emerging market like Nigeria. Being a professional course, upon graduation (and having obtained the required licensing), real estate graduates can establish a thriving real estate practice, thereby taking advantage of the emerging business opportunities in Nigeria's real estate sector.

4.3 Analysis of Motivators and Obstacles to Students' Entrepreneurial Intentions

The study examined the respondents' perceptions of the motivators and barriers to real estate entrepreneurship to assess the students' entrepreneurial intentions further. As shown in Table 5, the analysis of the motivators reveals that male students are motivated mainly by the opportunity to become their own boss, financial independence and preference for flexible

working time, with mean values of 4.06, 4.00 and 3.98, respectively, on a 5-point Likert scale. The least influential motivators are: helping others with their housing needs, provision of support for young entrepreneurs and following examples of role models. These have mean values of 3.54, 3.48 and 3.08 respectively. The female respondents rated motivators related to financial independence (mean = 4.08), becoming their own boss (mean = 4.08), and desire for a higher income (mean = 4.06) as the top three influential factors motivating their real estate entrepreneurial intentions. The least influential motivators by the females relate to preference for non-repetitive tasks, ability to measure investment output and following examples of role models, with mean values of 3.79, 3.78 and 3.48, respectively.

Table 5: Motivators of Entrepreneurial Intentions

Motivators	**Male**		**Female**		**Total**		**t-test**		
	Mean(s.d)	**r**	**Mean(s.d)**	**r**	**Mean(s.d)**	**r**	**t**	***p-value***	**M.D.**
To be my own boss	4.06(0.99)	1	4.08(0.8)	2	4.06(0.94)	1	-0.13	0.89	-0.02
To have financial freedom and independence	4.00(1.06)	2	4.08(0.8)	1	4.03(0.98)	2	-0.49	0.63	-0.08
Possibility of attaining higher income	3.97(1.03)	4	4.06(0.9)	3	4.01(1.00)	3	-0.58	0.56	-0.10
To realise my dream	3.90(1.19)	9	4.02(0.8)	4	3.95(1.07)	4	-0.70	0.50	-0.12
To take advantage of opportunities in the market	3.94(1.09)	5	3.92(0.8)	14	3.93(1.00)	5	0.13	0.89	0.02
The desire for freedom/flexible working time	3.98(1.09)	3	3.86(1.0)	20	3.93(1.05)	6	0.67	0.50	0.12
Increase my prestige and status	3.90(1.08)	8	3.97(1.0)	9	3.93(1.06)	7	-0.40	0.69	-0.07
To have job security	3.90(0.99)	7	3.95(1.0)	11	3.92(1.00)	8	-0.33	0.74	-0.05
For personal satisfaction and growth	3.93(1.06)	6	3.91(1.0)	16	3.92(1.04)	9	0.16	0.87	0.03
Ability to choose own work task	3.87(1.07)	11	3.97(0.9)	7	3.91(1.01)	10	-0.60	0.55	-0.10
The real estate business has the potential to make me rich	3.88(1.15)	10	3.94(0.9)	13	3.90(1.06)	11	-0.35	0.73	-0.06
To challenge me	3.82(1.16)	13	3.98(0.9)	6	3.89(1.06)	12	-0.99	0.33	-0.17
Desire for independence	3.83(1.08)	12	3.95(0.8)	10	3.88(0.99)	13	-0.78	0.44	-0.13
Personal fulfilment	3.77(1.14)	16	3.97(0.9)	8	3.85(1.06)	14	-1.19	0.24	-0.20
I can cope with the job demand required in the real estate business practice	3.79(1.14)	15	3.90(0.8)	17	3.84(1.03)	15	-0.71	0.48	-0.11
To take advantage of my education and training	3.74(1.12)	17	3.94(0.8)	12	3.82(1.02)	16	-1.27	0.21	-0.20
I enjoy motivating others	3.68(1.09)	18	4.00(0.8)	5	3.81(0.99)	17	-2.09	**0.04***	-0.32

To take advantage of my innate business talent	3.79(1.03)	14	3.81(0.9)	23	3.80(0.98)	18	-0.16	0.87	-0.03
To provide employment	3.67(1.22)	19	3.89(1.1)	18	3.76(1.17)	19	-1.18	0.24	-0.23
I enjoy taking risks and investing	3.66(1.13)	20	3.87(0.9)	19	3.75(1.08)	20	-1.19	0.24	-0.21
Ability to measure the direct output of investments	3.64(0.95)	21	3.78(1.0)	26	3.70(0.98)	21	-0.90	0.37	-0.14
Preference for varied and non-repetitive tasks	3.63(1.03)	22	3.79(0.9)	25	3.69(0.99)	22	-0.96	0.34	-0.16
Good economic environment	3.62(1.20)	23	3.80(1.0)	24	3.69(1.13)	23	-0.96	0.34	-0.17
To sustain the entrepreneurial family culture	3.56(1.26)	24	3.83(0.9)	22	3.67(1.16)	24	-1.49	0.14	-0.27
Helping others to fulfil their dreams/desires regarding housing/shelter	3.54(1.14)	25	3.84(0.9)	21	3.66(1.06)	25	-1.80	**0.07****	-0.30
To provide support for younger real estate entrepreneurs	3.48(1.14)	26	3.91(0.9)	15	3.66(1.06)	26	-2.56	**0.01***	-0.42
Desire to follow the example of role model(s)	3.08(1.34)	27	3.48(1.3)	27	3.24(1.34)	27	-1.86	**0.07****	-0.41
Aggregate motivators	3.75(0.77)		3.91(0.65)		3.82(0.73)		-1.32	0.19	-0.16

**p-value significant at 0.05, ** p-value significant at 0.10*

Overall, the results show a group of respondents are motivated by the yearning to be their own boss, financial freedom and attainment of higher income. These factors have mean values of 4.06, 4.03 and 4.01, respectively. The least influential motivating factors relate to helping others with their housing needs (mean = 3.66), provision of support for young entrepreneurs (mean = 3.66) and following examples of role models (mean = 3.24).

The responses show the preferences of the respondents towards financial and flexibility motives. It might thus be concluded that financial motivations and the need for flexibility were influential drivers of the respondents' entrepreneurial intentions. The results showed that core real estate issues such as providing shelter, professional mentoring and role models were not rated as highly influential motivators. This might be due to the paucity of active and available mentors/real estate professionals who could serve as significant influencers and who are actively involved in capacity building for the younger real estate graduates. The result of the statistical significance at $p < 0.05$ showed that there was no statistically significant difference between the ratings of the two categories of respondents across most of the variables, except for two items. These are satisfaction derived from motivating others at $p = 0.04$ and providing support for young entrepreneurs at $p = 0.01$. Across most of the factors, the females rated the influences of the motivating factors more highly than their male counterparts, as shown by the negative mean differences. Perhaps because of the higher level of interest women have in real estate entrepreneurship (see Table 4), females perceive the motivators better than males.

Regarding the motivation, the desire for freedom/flexible working times, the ratings showed that both genders rated it highly. This further reinforces the value placed on flexible working

time by real estate students in general. From a gendered perspective, this reinforces the submission of Meyer and Kyser (2019) that women take up entrepreneurship as it provides more flexibility.

Concerning the perceived obstacles to entrepreneurial intentions, the analysis presented in Table 6 reveals that the male students' entrepreneurial intentions are challenged by factors relating to start-up finance (mean = 3.85), collateral requirements (mean = 3.72) and a weak economic environment (mean = 3.51). Similarly, significant challenges as rated by the females relate to collateral requirements, start-up finance and cultural barriers. These have mean values of 3.69, 3.67 and 3.59 respectively. This rating underscores the importance of finance (start-up capital) and a conducive economic environment for entrepreneurial activities. This perception also aligns with the findings of Panda (2018) that women entrepreneurs in developing countries are faced with constraints arising from difficulty in raising capital. This also supports the assertion of Anambane and Adom (2018) regarding the cultural and societal challenges that limit female entrepreneurial intentions. While these findings reinforce the importance of finance for start-up entrepreneurs, it also brings to the fore the cultural barriers faced by female entrepreneurs. Based on their cultural inclinations, women are often faced with limitations that may impact their entrepreneurial motivations, aspirations and performance as they are expected to conform to standard norms and conventions that may conflict with their entrepreneurial Role (Shelton, 2006, 2008; Hundera et al., 2019).

Table 6: Barriers to Entrepreneurial Intentions

Perceived Obstacles	**Male**		**Female**		**Overall**		**t-test**		
	Mean(S.D.)	**r**	**Mean(S.D.)**	**r**	**Mean(S.D.)**	**r**	**t**	***p-value***	**M.D.**
Difficulty in obtaining finance for a start-up	3.85(1.26)	1	3.67(1.20)	2	3.77(1.23)	1	0.89	0.38	0.18
Lack of assets for collateral	3.72(1.25)	2	3.69(1.12)	1	3.71(1.20)	2	0.15	0.88	0.03
Weak economic environment	3.51(1.25)	3	3.51(1.21)	7	3.51(1.23)	3	0.01	0.99	0.00
The rigorous registration process with the professional bodies	3.45(1.15)	4	3.56(1.14)	4	3.49(1.14)	4	-0.63	0.53	-0.12
High cost of business registration	3.34(1.26)	7	3.52(1.17)	6	3.41(1.22)	5	-0.86	0.39	-0.18
Lack of personal savings	3.36(1.37)	6	3.42(1.23)	9	3.38(1.31)	6	-0.29	0.77	-0.06
Lack of information about any government agency that can assist in funding real estate business	3.36(1.14)	5	3.34(1.09)	12	3.35(1.12)	7	0.10	0.92	0.02
Cultural barriers to starting a real estate business	3.13(1.13)	12	3.59(1.09)	3	3.32(1.13)	8	-2.51	**0.01***	-0.46
Future uncertainty about the local market	3.23(1.11)	10	3.32(1.21)	13	3.27(1.15)	9	-0.50	0.62	-0.09

Fear of business failure	3.25(1.25)	8	3.27(1.26)	15	3.26(1.25)	12	-0.08	0.93	-0.02
The risk involved does not match the time and effort	3.07(1.20)	15	3.54(1.18)	5	3.26(1.21)	11	-2.43	**0.02***	-0.47
Perceived discrimination against female entrepreneurs	3.12(1.20)	14	3.46(1.13)	8	3.26(1.18)	10	-1.77	**0.08****	-0.34
Difficult to find the right partners to start a real estate business	3.13(1.19)	13	3.41(1.16)	10	3.25(1.18)	13	-1.47	0.14	-0.28
Lack of real estate business experience	3.24(1.30)	9	3.16(1.30)	17	3.21(1.30)	14	0.36	0.72	0.08
Lack of real estate business skills (financial, marketing)	3.15(1.16)	11	3.27(1.21)	14	3.20(1.18)	15	-0.60	0.55	-0.12
Lack of information about how to start a real estate business	3.02(1.30)	16	3.35(1.23)	11	3.15(1.28)	16	-1.55	0.12	-0.33
Difficulty in convincing others about real estate business idea	2.95(1.16)	18	3.23(1.25)	16	3.10(1.21)	17	-1.89	**0.06****	-0.37
The risk in real estate practice far outweighs the benefits	2.98(1.09)	17	3.11(1.11)	19	3.03(1.10)	18	-0.74	0.46	-0.13
Lack of support from real estate business mentors	2.87(1.28)	19	3.13(1.24)	18	2.97(1.26)	19	-1.25	0.21	-0.26
Lack of support from family and/or friends	2.80(1.16)	20	2.74(1.30)	20	2.78(1.22)	20	0.31	0.76	0.06
Aggregate obstacles	3.22(0.75)		3.37(0.79)		3.29(0.77)		-1.20	0.23	-0.15

**p-value significant at 0.05, ** p-value significant at 0.10*

The least influential inhibitors by the males are the support from real estate mentors (mean = 2.87) and support from family and/or friends (mean = 2.80). However, the least rated inhibitors by the females are greater perception of risk than the benefits (mean = 3.11) and support from family and friends (mean = 2.74). Though these obstacles were the least influential, their mean values are close to the midpoint (3.00). Hence, these factors could still be considered major inhibitors to the respondents' entrepreneurial intention. The results of the aggregated responses present a similar outcome to the findings along gender lines. Factors such as start-up finance, collateral requirements and a weak economic environment were highly influential obstacles to entrepreneurial intentions. The least influential debacles relate to risk perception, real estate business mentors' support, and family and/or friends. It thus appears that there is some measure of support from family and friends regarding the entrepreneurial intentions of the respondents. The females rated a lower level of obstacles relating to getting support from family and/or friends; this might suggest that female students receive support from their families even though it is not a typical line of work for a female to enter into.

The findings suggest that societal perceptions influence the entrepreneurial intentions of female real estate students in Nigeria. The perception of the females regarding the influences of obstacles was higher than the male students, as evidenced by the negative mean differences (M.D.) for most of the factors and -0.15 on the aggregate. Perhaps, owing to the gender bias nature of the industry (Poon & Brownlow, 2016), females might be expected to have a higher level of inhibition towards real estate entrepreneurship than their male counterparts. However, the mean difference of -0.46 for cultural barriers to starting a real estate business is noted. Suffice to note that cultural barriers such as perceptions about female entrepreneurs and the reservations about their capacities, perhaps owing to the expectations that the business would fail, often limit their chances of getting the needed cooperation for the entrepreneurial drive.
An examination of the statistical variation between the two categories of respondents showed that only two obstacles relating to cultural barriers and perception of the risk-return benefits were statistically significant at $p < 0.05$. Perceived discrimination against female entrepreneurs and difficulty convincing others about real estate business, having negative mean differences, were statistically significant at the 10% level.

4.4 Grouping of Factors Influencing Entrepreneurial Intentions

The study sought to identify important variables influencing entrepreneurial intentions based on gender differences. Some dependent variables having similar underlying components may be correlated with one another. The P.C.A. was adopted to summarise the variables into a few groups/clusters of the original variables to identify the underlying correlations easily. Across the two categories of respondents, the P.C.A. of the motivating factors showed that the factors satisfied the factorability criteria, having Keiser Meyer Olkin (K.M.O.) values of 0.892 and 0.790 for the males and females, respectively. This suggests that the correlation loadings of the variables are compact and that reliable factors will be obtained based on the P.C.A. Also, Bartlett's Test of Sphericity reached a statistically significant level, with a *p*-value= 0.000.

As presented in Table 7, the male respondents showed a three-factor solution explaining 60.57% of the total variance. The first factor, labelled flexibility/financial, explains 27.61% of the total variance, while the second factor, explaining 18.88% of the total variance, relates to self-perception/entrepreneurial interest. The third factor is mentoring/socio-economic factors. This explains 14.084% of the total variance.

Table 7: Total Variance Explained Table for Motivating Factors

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
Males									
1	13.46	49.85	49.84	13.46	49.85	49.85	7.45	27.61	27.61
2	1.50	5.56	55.41	1.50	5.56	55.40	5.10	18.88	46.48
3	1.39	5.16	60.57	1.39	5.16	60.57	3.80	14.08	60.57
Females									
1	13.16	48.74	48.74	13.16	48.74	48.74	6.62	24.52	24.52
2	2.46	9.10	57.85	2.46	9.10	57.85	6.18	22.87	47.39
3	1.50	5.579	63.42	1.50	5.57	63.42	4.33	16.03	63.42

Extraction Method: Principal Component Analysis.

The analysis of the female students (Table 7) showed that three factors were extracted, explaining 63.42% of the total variance. The first factor, labelled entrepreneurial interest/financial factors, explains 24.52% of the total variance. The second and third factors relate to economic factors and personal preference/fulfilment. These explain 22.87% and 16.03% of the total variance, respectively.

Table 8 gives the details of the extraction and factor loadings concerning the motivating factors for either gender. An examination of the variance of the motivators to ascertain their relative influence showed that flexibility/financial factors were the most influential in determining the entrepreneurial intentions of the male respondents. This is followed by self-perception/entrepreneurial interest and mentoring/socio-economic factors (decreasing order). However, the motivations for female students in reducing order are entrepreneurial interest/financial factors, economic factors and personal preference/fulfilment. Thus while different factors influence either gender, economic/financial benefits are a common denominator across both categories of respondents. The finding on motivators relating to the influence of economic consideration is consistent with the study of Pruett *et al.* (2009).

Table 8: Rotated Component Matrix for Motivating Factors

Factors/items		**Loadings**	**Extraction**	**Percentage of Variance**
Males				
1	**Flexibility/Financial Factors**			**27.61**
	To be my own boss	.790	.714	
	To take advantage of opportunities in the market	.769	.751	
	Desire for independence	.738	.719	
	To have job security	.738	.708	
	For personal satisfaction and growth	.689	.573	
	To have financial freedom and independence	.683	.661	
	The desire for freedom/flexible working time	.683	.645	
	Ability to choose own work task	.636	.670	
	To realise my dream	.615	.580	
	Possibility of attaining higher income	.603	.631	
2	**Self-perception/Entrepreneurial Interest**			**18.88**
	I enjoy taking risks and investing	.793	.659	
	To sustain the entrepreneurial family culture	.707	.569	
3	**Mentoring/Socioeconomic Factors**			**14.08**
	To provide support for younger real estate entrepreneurs	.736	.591	
	Follow the example of my role model(s)	.719	.604	
	To provide employment	.650	.722	
Females				
1	**Entrepreneurial Interest/Financial Factors**			**24.52**
	To sustain the entrepreneurial family culture	.779	.649	
	The real estate business has the potential to make me rich	.754	.636	
	To have financial freedom and independence	.719	.582	
	Possibility of gaining higher income	.717	.648	
	I enjoy motivating others	.670	.622	
	Ability to choose own work task	.660	.609	
	Good economic environment	.646	.485	
	Increase my prestige and status	.616	.523	
2	**Economic Factors**			**22.87**
	To provide employment	.840	.788	

	To provide support for younger real estate entrepreneurs	.837	.772	
	To take advantage of my innate business talent	.835	.785	
	To have job security	.821	.760	
	For personal satisfaction and growth	.808	.705	
	To take advantage of opportunities in the market	.770	.762	
3	**Personal Preference/Fulfilment**			**16.03**
	Love varied and non-repetitive tasks	.795	.765	
	Ability to measure the direct output of investments	.752	.714	
	Follow the example of my role model(s)	.746	.613	
	To challenge me	.612	.698	

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalisation.

Regarding the perceived obstacles to the students' entrepreneurial intentions, the factorability test gave K.M.O. values of 0.832 and 0.768 for the males and females, respectively, with significant levels of $p = 0.000$. This implies that the data set satisfies the factorability criteria. Subsequently, a four-factor solution (Table 9) explaining 64.29% of the total variance was extracted for the males. The first factor - support system/marketability skills accounted for 18.94% of the total variance. While the second factor relates to economic influence/market information, the third factor pertains to finance. These explained 15.45% and 15.09% of the total variance, respectively. The fourth factor, risk perception/cultural barriers, accounted for 14.80% of the total variance.

Table 9: Total Variance Explained Table for Inhibiting Factors

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
Males									
1	7.88	39.39	39.39	7.88	39.39	39.39	3.79	18.95	18.95
2	2.20	11.02	50.40	2.20	11.02	50.40	3.09	15.45	34.39
3	1.47	7.35	57.75	1.47	7.35	57.75	3.02	15.10	49.49
4	1.31	6.54	64.30	1.31	6.54	64.30	2.96	14.80	64.30
Females									
1	9.02	45.09	45.09	9.02	45.09	45.09	4.61	23.04	23.04
2	2.12	10.58	55.67	2.12	10.58	55.67	3.77	18.87	41.91
3	1.68	8.41	64.08	1.68	8.41	64.08	3.13	15.65	57.56
4	1.06	5.31	69.39	1.06	5.31	69.39	2.37	11.83	69.39

Extraction Method: Principal Component Analysis

The P.C.A. of the female students showed a four-factor solution (Table 9), explaining 69.39% of the total variance. The first factor relates to the market environment/support system, and the second relates to cultural/discriminatory practices and risk perception. These two explain 23.04% and 18.87% of the total variance. While the third component relates to finance, accounting for 15.65% of the cumulative variance. The fourth factor, market experience/information, accounted for 11.83% of the total variance.

Table 10 shows the variable loading for each component based on gender differentiation. An examination of the variances to ascertain the relative influence of each of the factors for either gender reveals that support system/marketability skills were the major inhibiting factor for the males'. This is followed by economic influence/experience, finance and risk perception/cultural

barriers, decreasing order of importance. Variables loaded under support system/marketability skills include difficulty convincing others about the real estate business, lack of support from real estate mentors, difficulty finding the right partners, and lack of support from family and/or friends. The high cost of business registration, weak economic environment, and lack of information about starting a real estate business are factors loaded under the economic influence and market information.

Regarding factors relating to finance, this includes a lack of assets to use as collateral, difficulty in obtaining finance for establishing a venture and lack of personal savings. The last component for the men is risk perception/cultural barriers had two variables. These risks do not match the time and effort and cultural barriers to real estate as variables loaded.

However, for the females, the inhibiting factors are market environment/support system, cultural/discriminatory practices and personal risk perception, finance and experience in the real estate business. The first factor, market environment/support system, had variables such as fear of business failure, the fear of the risks associated with real estate entrepreneurship, fear of uncertainty regarding the local real estate market, lack of support from real estate business mentors, lack of support from family and/or friends. Variables such as cultural barriers to starting a real estate business, the risk involved in not matching the time and effort, and discrimination against female entrepreneurs were loaded under the second factor. The third component, finance, is detailed in the previous paragraph. The last component for the females, market experience/information, had two variables: lack of real estate business experience and lack of information about starting a real estate business. A comparative analysis shows that the effect of cultural/discriminatory barriers appears more dominant for females. While this corroborates previous submissions, the implication of this reflects the need for a conducive socio-cultural environment where entrepreneurship ideas are allowed to thrive irrespective of gender and socio-cultural inclinations. A common inhibiting factor across both categories of respondents is finance. Entrepreneurship thrives on funding, and lack of finance impacts the interest and capacity of nascent entrepreneurs.

Table 10: Rotated Component Matrix for Inhibiting Factors

Factor/Items		Loadings	Extraction	Percentage of Variance
Males				
1	***Support System/Marketability Skills***			***18.95***
	Difficulty in convincing others about real estate business idea	.800	.702	
	Lack of support from real estate business mentors	.767	.626	
	Difficult to find the right partners to start a real estate business	.717	.655	
	Lack of support from family and/or friends	.625	.546	
2	***Economic Influence/Market Information***			***15.45***
	High cost of business registration	.858	.772	
	Weak economic environment	.616	.651	
	Lack of information about how to start a real estate business	.600	.598	
3	***Finance***			***15.10***
	Lack of assets for collateral	.869	.792	
	Difficulty in obtaining bank finance for a start-up	.848	.752	
	Lack of personal savings	.746	.570	
4	***Risk Perception/Cultural Barriers***			***14.80***
	The risk involved does not match the time and effort	.841	.734	
	Cultural barriers to starting a real estate business	.819	.768	
Females				
1	***Market Environment/Support System***			***23.04***
	Fear of business failure	.796	.721	
	The risk in real estate practice is too much to allow me to engage in the practice	.795	.729	
	Future uncertainty about the local market	.787	.699	

	Lack of support from real estate business mentors	.732	.685	
	Lack of support from family and/or friends	.724	.654	
2	***Cultural/Discriminatory Practices and Risk Perception***			***18.87***
	Cultural barriers to starting a real estate business	.851	.804	
	The risk involved does not match the time and effort	.815	.767	
	Perceived discrimination against female entrepreneurs	.771	.748	
3	***Finance***			***15.65***
	Difficulty in obtaining bank finance for a start-up	.877	.855	
	Lack of assets for collateral	.806	.824	
	Lack of personal savings	.791	.681	
4	***Market Experience/Information***			***11.83***
	Lack of real estate business experience	.778	.758	
	Lack of information about how to start a real estate business	.683	.827	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation

5. Conclusion

The study aimed at examining the gender-based differences in the entrepreneurial aspirations of real estate students in Nigeria. The study revealed that there is a high level of interest by the respondents, especially the female students regarding real estate entrepreneurship. Influential factors motivating the students' entrepreneurial intentions across either gender showed that the males were motivated by factors such as flexibility/financial factors, self-perception/entrepreneurial interest and mentoring/socio-economic factors. The females' motivation stemmed from entrepreneurial interest/financial factors, economic factors and personal preference/fulfilment. A common motivator to either group of respondents was financial factors. This suggests that financial gains are influential drivers motivating students' entrepreneurial intentions, as with most entrepreneurial decisions.

An examination of the barriers showed that a support system and marketability was influential inhibiting factor for the males, amidst other factors such as economic influences/market information, finance and risk perception/cultural barriers. Market environment/support system was the most influential inhibiting factor for the females, amidst others such as cultural/discriminatory practices/risk perception, finance and market experience/information. While extant studies have reiterated cultural/discriminatory practices have a significant influence on female students' entrepreneurial intentions, the results showed that cultural/discriminatory practices' influence on female students' entrepreneurial intention was rated second aftermarket environment/support system. Additionally, as noted by either gender, the challenge of finance has significant implications for the realisation of entrepreneurship intentions. The challenges of finance will influence the nature and scope of the real estate business to be considered by the students.

The present study's findings are only indicative of the intentions of real estate students toward real estate entrepreneurship. Longitudinal studies could establish the actual career paths of the students, particularly for those who became real estate entrepreneurs, and the factors that influenced such decisions, perhaps along gender lines. Summarily, the findings suggest that there are gender-based differences in the entrepreneurial aspirations of real estate students in Nigeria.

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Resource Utilisation of Tertiary Education Trust Fund Intervention Projects in Nuhu Bamalli Polytechnic Zaria, Kaduna State, Nigeria

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Abstract

This study evaluates the Tertiary Education Trust Fund (TETFund) intervention projects and space utilisation in Nuhu Bamalli Polytechnic (NUBAPOLY) Zaria of Kaduna state, Nigeria. The study relates to the funding and utilisation of physical projects in NUBAPOLY. The study population consisted of all the twenty-one (21) staff of the physical planning department of Nuhu Bamalli Polytechnic, Zaria. The respondents were selected based on a convenience sampling technique. A total of 21 copies of the questionnaire were administered and retrieved from the respondents. The data collected were analysed using descriptive statistics. Findings from the study revealed that the construction of new buildings (52.4%) and the provision of laboratory equipment and furniture (33.7%) had the highest allocation of funds, respectively. The overall space utilisation for NUBAPOLY is 43.60%. In comparison, renovation of buildings had the least (1.0%). Based on these findings, it was recommended that TETFund should ensure adequate utilisation of its intervention projects through supervision and inspection. The management of Nuhu Bamalli Polytechnic should make optimum utilisation of TETFund intervention projects, especially on the Main and Annex campuses, to improve the quality of education.

Keywords: tertiary education, trust fund, intervention projects, physical facilities, space management

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1. Introduction

The introduction of the Tertiary Education Trust Fund (TETFund) to serve as an intervention fund for financing projects in higher institutions in Nigeria shows the commitment of the Nigerian Government in addressing the challenges of funding education in the country. The Fund was established following the recommendation of the Longe Commission for the imposition of a 2% Higher Education Tax on profits declared by the companies registered in Nigeria (Uhunmwuangho, 2005).

In 1993, the Nigerian Government promulgated the Education Tax Decree No.7 of 1993 (Uhunmwuangho, 2005) following dialogue between the Academic Staff Union of Universities (ASUU) and the Federal Government in the aftermath of ASUU 1991-1992 industrial action. Additionally, the Tertiary Education Trust Fund was established when successive governments left the education system unattended for many years, resulting in severe infrastructure decay: academic, teaching and research facilities (Oluwalola, Alabi & Abdulkareem, 2014). In addition, the morale of the teaching profession weakened and real interest in teaching and learning was eroded by the poor state of the country's educational system. This posed many problems in utilising the Fund to face the diverse challenges within the sector.

Resources are necessary for attaining educational objectives effective teaching and learning processes at the school level. Teaching and learning do not occur in a vacuum but rather in a structured environment. Educational resources include human and non-human (material, physical and financial) resources (Abdul Kareem, 2011). Human resources are the students and staff; material resources refer to the instructional materials, while physical resources include the classrooms, lecture theatres, administrative blocks, libraries and other structures. According to Adeogun and Osifila (2008), financial resources are the monetary inputs available for and expended on the education system. Therefore, resources are crucial factors in student academic achievement in schools, colleges, and universities. Ijaiya (2004) opined that education without quality is a destroyer and a betrayal of trust.

Funding for higher education institutions (HEI) in Nigeria has frequently been given less consideration in government budgetary allocation (Akinyemi, 2013). This has negatively affected the development of the education sector, especially the HEI system (Durosaro, 2012). The number of students admitted into higher institutions is increasing, but there are no sufficient facilities to accommodate the students. Moreover, the existing ones are obsolete, and there is insufficient allocation to construct physical facilities and procure new equipment. Therefore, existing facilities need to be appropriately utilised.

Acknowledging that facilities in higher institutions are inadequate and the Government alone cannot meet the demands of these institutions, the Federal Government promulgated the education tax decree to support funding education in Nigeria. This led to the establishment of the Tertiary Education Trust Fund (TETFund) to serve as an intermediary in addressing the problem of funding in Nigerian HEIs. The TETFund is an essential stakeholder in the nation's educational system. The Fund has contributed immensely in constructing infrastructures and providing equipment and facilities in Nigerian higher institutions. It is the motivation of this study to examine the intervention of TEDFund in higher institutions in Nigeria. Specifically, this study would focus on the areas of TETFund intervention in Nuhu Bamalli Polytechnic Zaria, Nigeria, and resource utilisation rates in terms of time, space and global utilisation rates in Nuhu Bamalli Polytechnic Zaria, Nigeria.

2. Literature Review

Ihuoma (2008) elucidated that resource utilisation is an integral part of overall school management. Therefore, the actualisation of educational goals and objectives requires the provision and maximum utilisation of essential resources. School facilities contribute the significant components of direct and indirect action elements in a learning environment. Nwogwu (2000) stated that the quality of education that children receive bears direct relevance to the availability or lack of physical facilities and overall atmosphere in which the learning takes place, while Hallack (1990) emphasised that the availability, applicability and utilisation of educational resources contribute to academic achievement, and that non-availability or poor utilisation of resources bereft of aesthetic beauty contribute to poor student academic performance.

Al-Kurdi El-Haddadeh, & Eldabi (2018) noted two main goals of higher education institutions: creating and disseminating knowledge. The creation of knowledge is done through research and its dissemination through education. Therefore, education and research are their central processes (Al-Kurdi, El-Haddadeh, & Eldabi, 2018). According to Jain, Sinha & Sahney (2011), institutions of higher learning services are classified into two groups: facilities and academic programs. The student flow in institutions of higher learning from admission to graduation is presented in his model (Figure 1.1). Sirvanci (2004) assumes that those services will influence students' teaching and learning experience in the model.

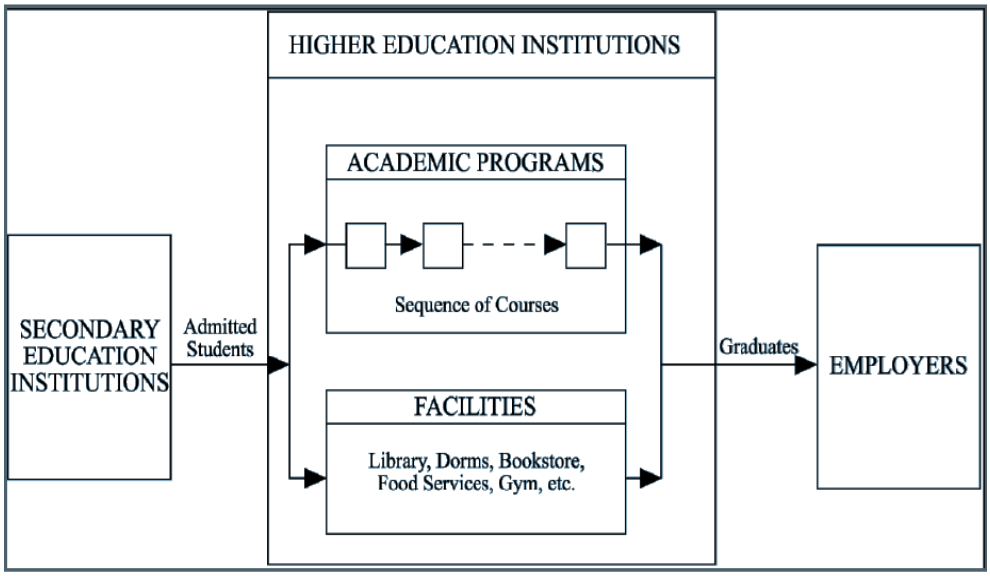

Figure 1.1 Student Flow in Institution of Higher Learning

For higher education institutions to deliver their research mission and core teaching, the provision and maintenance of substantial infrastructures need to be up to date. This often comprises an extensive estate and buildings, including offices, lecture theatres, laboratories, sports and recreation centres, residential accommodation, and catering facilities. According to Zabadi (2013), institutions of higher learning need quite a considerable amount of support and services to realise their primary objectives – teaching and research. Properties and buildings in institutions of higher learning are specifically facilitators of organisational performance (Adama & Michell, 2018: Bachmann & Inkpen 2013). This approves the opinion that academic

facilities are significant resources to the institutions of higher learning in the provision of their core activities. The learning process factor does not happen merely in the classroom; it also integrates with the facilities.

As one of the major policy areas of most countries globally, education is not immune from the global effects (Tsai & Berverton, 2007). Since the beginning of the 21st century, tertiary education has operated in a changing environment with unprecedented challenges, arising from the convergent impacts of globalisation, the increasing importance of knowledge as a principal driver of growth, and the information and communication revolution (World Bank, 2002). Such changes have constantly impinged on all areas of facilities provision and resources management (Holmes & McElwee,1995). Other challenges facing higher education worldwide include the need for quality assurance and standards against a backdrop of increased participation, the expansion in student numbers, the meeting of new expectations in terms of the employability of the graduates in the knowledge society, the addressing of demands from a variety of stakeholders and the contribution to the achievement of social and political agendas such as access, inclusion and equity (Campbell & Roznyai, 2002). In the rapidly changing environment of higher education, efficient resource utilisation and maintenance of high quality and standards in education have become a major concern for higher education institutions and governments. Higher education relies on the commitment to their faculty, presence and availability to students and colleagues, which will have an enormous influence in creating an atmosphere that encourages learning (World Bank, 2000). Such actors and stakeholders in higher education need to avail adequate resources to perform their functions to contribute to educational outcomes. Ihuoma (2008) emphasised that both teachers and students need flexible modern facilities for academic and social activities. Effective resource utilisation is crucial for achieving goals and objectives at every level of education.

There are many resources involved in any economic activity, and these have been categorised in a variety of ways (MacLean, 2005, Barney, 2001, Grant, 1991). These authors believe that resource utilisation contributes to creating a sustained competitive advantage. However, their views do not explain how these resources are created, deployed or utilised. This study set out to address one part of the problem by focusing on Tertiary Education Trust Fund (TETF) intervention projects and their utilisation in Nuhu Bamalli Polytechnic Zaria, Kaduna state, Nigeria.

3. Methodology

The study adopted a descriptive research design to identify areas of the TETFund intervention project and evaluate resource utilisation rates in terms of time and space utilisation in the study area. The study population consisted of all the twenty-one (21) staff of the physical planning department of Nuhu Bamalli Polytechnic, Zaria. The respondents were selected based on a convenience sampling technique. The study population was used as a sample size because the study population is small. The researcher designed an instrument titled resource utilisation of the TETFund intervention project in Nuhu Bamalli Polytechnic. A total of 21 copies of the questionnaire were administered and retrieved from the respondents. The instrument's reliability was determined through a pilot test of five (5) respondents. The Cronbach Alpha Coefficient of 0.82 shows that the instrument was reliable for the study. The data was analysed using tables and percentages.

4. Results

This section presents the result of the data collected. A total of 21 copies of the questionnaire were administered and retrieved from the respondents. The data is analysed in the tables below.

Table 1: Areas of TETFUND Intervention and the Amounts Expended (in USD) Between 2010 to 2012 (at the Rate of 360 Naira per U.S. Dollar)

S.N.	Areas of Intervention	Total Amount Expended on Project Executed	% Allocation
1	Provision of Building	2,000,104.14	52.4
2	Renovation of Buildings	33,453.28	1.0
3	Provision of laboratory equipment and furniture	1,287,139.55	33.7
4	Transportation Facilities	385,666.64	10.1
5	Academic Staff Training and Development	109,688.52	2.8
	Total	3,816,052.16	100

Source: Field Survey 2020

Table 1 indicates that funds allocated to providing newly constructed buildings constituted the highest bulk of the TETFund intervention in Nuhu Bamalli Polytechnic (52.4%). Furthermore, the provision of laboratory equipment and furniture followed, comprising 33.7%, transportation facilities constituted 10.1%, academic staff training and development opportunities included 2.8%, while the renovation of buildings had the least allocation of 1.0%.

Table 2: TETFund educational facilities utilisation rates in Nuhu Bamalli Polytechnic Zaria, Nigeria

Campuses	No. of rooms	Hours used	Hours available	Occupancy	Capacity	Utilisation Rate (U)	Frequency Rate (F)	Occupancy Rate (O)
Main								
Classes	144	32	68	4149	6298	31.00%	47.10%	65.88%
Laboratory	36	24	38	2970	3940	47.60%	63.15%	75.38%
Studio	14	10	18	599	889	37.44%	55.56%	67.38%
Annexe								
Classes	102	30	63	3559	5117	33.12%	47.62%	69.55%
Laboratory	8	9	13	298	397	52.00%	69.23%	75.10%
Samarun/K								
Classes	72	15	18	174	274	52.91%	83.33%	63.50%
Laboratory	10	9	12	187	274	51.19%	75.00%	68.25%

Source: Field Survey 2020

Table 2 shows the results of the main campus, annexe campus and Samarun Kataf campus, respectively. The frequency rates for the classes, laboratories and studio of the main campus are poor, while the occupancy rates are fair. The frequency rate for classes of the Annex campus is very poor, while both the frequency and occupancy rates of the laboratory are reasonable. Finally, the Samarun Kataf campus frequency and occupancy rate for the classes and laboratory are good.

5. Discussion

Based on Table 1, TETFund intervention for the renovation of buildings allocated only 1.0% for that period; this may be due to NUBAPOLY not accessing the TETFund intervention early enough. Both had the highest allocation for the new construction of buildings (52.4%) and the provision of laboratory equipment and furniture (33.7%). The finding supports the submission

of Aprebo and Amaewhule (2018) that TETFund intervention mainly was allocated to the construction of new buildings and the provision of furniture and equipment. Table 2 revealed that main campus laboratory rooms had a utilisation rate of 47.60%. This signified the highest scores as compared to the classroom and studio. However, the utilisation score was only 31% for the lecture rooms due to the total number of rooms (144). The frequency rate scored lower than the occupancy rate for all the room types. We must critically address the frequency rate factors to increase the utilisation rate. The utilisation rate for the classroom of the annexe campus is 33.12%, slightly lower than that of the laboratory with a 52% rate. For the Samarun Kataff campus, the classroom and laboratory utilisation rates had a reasonable rate of 52.19% and 51.19%, respectively. Though, the frequency and occupancy rates, it's observed that the frequency rate scored the highest of 83.33% and 75% respectively than the occupancy rate for all the room types.

Overall, resource utilisation rates in terms of time and space utilisation in Nuhu Bamalli Polytechnic is below the minimum desired level of 50%. This contradicts the findings of Kolawole & Ogbiye (2020) and Afolabi (2006) that resources were moderately utilised in most education facilities in Nigeria. To have optimal benefits of TETFund intervention to higher institutions, especially in Nigeria, regular evaluation of TETFund intervention projects is required and the utilisation of the Fund to ensure that allocations are appropriately used for approved projects. Management of teaching and learning spaces for HEIs require the facility manager to address the students' usage of the academic space. Apart from the usage, they also need to look at the occupancy rate and productivity. The productivity of space can be measured through space utilisation. Based on the results and discussions, the overall space utilisation for NUBAPOLY is 43.60% which is encouraging. However, improving the arrangement of the classrooms needs to be addressed, as now it is more lecturer-oriented than student-oriented. Even though this study has addressed space capacity and types utilisation, it has not addressed the space standards. To look at this issue more clearly, scholars need to address the space standard for academic space.

5.1 Contribution of the Study

The paper supported by relevant literature from local and international authors (Adullahi et al. (2015), Aprebo & Amaewhule (2018), Kolawole & Ogbiye (2020)) has affirmed that educational institutions in Nigeria should manage their resources efficiently. All tertiary institutions across the globe operate in an environment in which they should do "more with less". Resource utilisation and quality educational outcomes are increasingly twin expectations of higher educational institutions. The paper argues that regular evaluation and space utilisation is required to ensure utilisation of TETFund intervention projects. Specifically,

i. The paper has validated that TETFund intervention is mainly allocated to constructing new buildings and the provision of furniture and equipment in Nigeria's tertiary institutions.
ii. The paper has confirmed that space utilisation is required to utilise resources efficiently.

6. Conclusion and Recommendations

From the findings of this paper, it can be concluded that the utilisation of TETFund intervention projects is critical to the internal efficiency of Nuhu Bamalli Polytechnic. Based on the findings of this paper, the following recommendations are being made:

i. TETFund should ensure adequate utilisation of its intervention projects through supervision and inspection.
ii. The management of Nuhu Bamalli Polytechnic should make optimum utilisation of TETFund intervention projects, especially in Main and Annex campuses, to improve the quality of education.
iii. The heads of the department should make it a priority for all lecturers and students to make use of available resources in teaching and learning processes.

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Adoption of Automated Valuation Models in Malawi: Valuers' Perception

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Abstract

The valuation profession is historically known for being more traditional and extensively using traditional valuation methods. Despite this, in the recent past, there have been strides to incorporate Automated Valuation Methods (AVMs) in the valuation profession, especially for rating, mortgages and revaluation purposes. The introduction of the new approach, however, attracted controversy when it was piloted in one of the cities in Malawi. This study sought to explore property valuers' perceptions of the adoption of AVM in rating valuation against the use of traditional valuation methods. The researchers used a descriptive study design with qualitative data collection and analysis methods. Semi-structured interview guides were used to collect data on valuers' perceptions of AVM. A total of 20 in-depth interviews were conducted with professional valuers. The valuers were asked how they perceive the AVM approach to rating valuation compared to traditional valuation methods regarding its accuracy, reliability, and easiness. Data were manually analysed using content analysis. The general perception of valuers towards AVM was mixed. One school of thought gave AVM the benefit of doubt for future incorporation into the profession if modified to suit the local environment. On the other hand, AVM was considered a threat to the valuation profession since anyone may be deemed qualified to carry out property valuation. However, the valuers are of the perception that the models will never replace traditional valuation methods, hence suggestions to incorporate AVM as a supplement to traditional valuation methods so that the former is used as a verification and auditing tool for the latter.

Keywords: automated valuation models, valuation profession, valuers' perceptions, traditional valuation methods, Malawi

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1. Introduction

Despite being in existence for decades, the literature on property valuation shows that the practice has mainly been carried out using traditional methods (Schulz, Wersing and Werwatz, 2014). This is a practice which Jahanshiri, Buyong and Shariff (2011) contend that it is reliant on the valuer's 'accumulated knowledge' and has challenges of inaccuracy, inconsistency and speed. Źróbek and Grzesik (2013) add that traditional valuation methods are more expensive, time-consuming and subject to errors. To overcome this, an automated valuation model exists in the property valuation market. This model is an advanced method of mass valuation for rating purposes and has the competitive advantage of speed, accuracy, accountability and transparency over traditional methods (Downie and Robson, 2009; RICS, 2017). However, despite the competitive advantage of AVMs over traditional valuation methods, the approach attracted controversy among professional valuers when piloted during mass valuation for rating purposes in one of the local councils in Malawi. This is because it is viewed as technical development and not necessarily an advanced approach to property valuation. Elsewhere, for example, in the United Kingdom, Denmark, Australia, North and Central America and South Africa, AVMs are used to assess property values for taxation and mortgage purposes since these countries are moving from the traditional methods (Royal Institution of Chartered Surveyors, 2013).

Therefore, this study sought to explore professional property valuers' understanding of AVM and determine the perception of the valuation professionals in Malawi towards the adoption of AVM in valuation for rating.

The following specific objectives were explored: how the valuers thought AVM would impact the valuation profession; how credible and accurate AVM is compared to traditional valuation methods; how valuers viewed the incorporation of AVM into the valuation profession; how would AVM affect the valuation profession in the country; and if AVM was posing any threat on the job market of the professional valuers in Malawi.

There is a paucity of literature on the adoption of AVM for rating purposes in most developing countries, including Malawi (Boshoff and de Kock, 2019; Bellotti, 2017; Downie and Robson, 2008), and no studies have been carried out to contextualise the phenomenon in the country. Despite the valuation profession being in existence in the country since 1964 (Cloete and Chikafalimani, 2001), no studies have been carried out to lay a foundation on how technological advancements have affected the valuation profession in the country. Therefore, this study will act as a benchmark for the perception of professional valuers on the adoption of AVM in the Malawian valuation profession.

2. Real Estate Valuation and the Valuation Profession

Valuation work includes valuation of real property to valuation of going concerns (Donovan, 2015). Such services are needed for different purposes by various institutions, for example, local governments, banks and individuals, among others (RICS, 2013). Principally, the valuation profession is regulated by local legislation, which mandates that practising professionals should be registered to carry out valuation services. So far, the commonly used international standard is the International Valuation Standards (IVS) and The Royal Institution of Chartered Surveyors guidelines (RICS) (Donovan, 2015). Essentially, property valuation

assesses what would be realised if interest was disposed of on an open market or the value an interest has to the property occupant (Gilbertson and Preston, 2005). This means the comprehensiveness and level of information detail required by the client influences the range of valuation services to be rendered to the client(s) (Gilbertson and Preston, 2005; Downie and Robson, 2009) hence the need for understanding the dynamics driving the marketplace by the valuers to provide best services (Gilbertson and Preston 2005).

2.1 Automated Valuation Models

Many definitions of AVM exist depending on the context. The International Association of Assessing Officers (2011) define AVM as a mathematically programmed computer software that estimates market values through analysing the location, property market conditions and property characteristics against the information in the database, whereas RICS (2013) puts it that AVMs' use one or more mathematical techniques to provide an estimate of the value of a specified property at a specified date, accompanied by a measure of confidence in the accuracy of the result, without human intervention post-initiation.

Blacklege, (2009) argues that information technology and the internet have made tremendous changes to the valuation profession by making the valuation process be undertaken more easily, eliminating subjectivity and improving accuracy. This is because these advancements do not depend on the valuer's skills and experience. RICS (2013) contends that AVMs are penetrating the property market throughout the world. This observation is also shared by Blackledge (2009), who mentions that AVM was developed to allow for a rapid assessment of a property value since the user is only required to input the required information of the subject property, and the system does the rest to come up with the value of the subject property. This has been an established feature in the property markets of the United States, Germany and Canada and has been used in the assessment of properties for different purposes such as taxation and mortgage (Downie and Robson, 2009; Boshoff and de Kock, 2013; RICS, 2013; RICS, 2017). Literature indicates that the main challenge to AVM is the availability of market data (Boshoff and de Kock, 2013; RICS, 2017). Where market data is insufficient, AVM usage becomes a challenge. However, a well-maintained property transactions database creates a conducive environment for AVM (Bidanset, 2015). Despite the valuation profession being in existence for over six decades in Malawi (Cloete and Chikafalimani, 2001), there exists no property database where recent and up to date property valuations and transactions data can be found apart from the individual valuers who hold that data privately.

Boshoff and De Kock (2013) argue that the source of data is market value valuations which create a reliable database within a conducive environment for AVM. Boshoff and De Kock (2013) further add that the general applicability of AVM varies significantly from one country to another, and Southern African countries are relatively suspicious of the adoption of AVM despite being consistent, transparent, manageable, time and cost-saving and able to combat fraud and bias. This relates well with Donovan (2015), who observed that at its core, AVM is principally meant to produce a valuation that is objective and independent of human bias and error. However, RICS (2017) contend that there is a high likelihood of erroneous valuations using AVM if 'bad data' finds its way into the system. This suggests that despite AVMs being game-changers on one end, they also have their own loopholes, which, if not managed well, can distort the valuation process.

2.2 Benefits of AVM over Traditional Valuation Methods

Debate on the benefits of AVM over traditional methods is still ongoing (Allen, 2013). However, AVM is rated highly in terms of speed and cost-saving (Tretton, 2007) over traditional methods. On the other hand, traditional methods are also preferred during physical property inspection since it reveals the subject property's overall condition, which AVM cannot (IAAO, 2003; Rossini, 2008; RICS, 2017). The absence of property inspection in AVM has subjected it to the debate as to whether it is a suitable replacement for traditional methods and if AVM can be wholly adopted in the valuation profession or should be used as a supplement to the traditional valuation methods (Boshoff and de Kock, 2013).

Gilbertson and Preston (2005) argued that despite AVM being speedy and cheaper, unlike traditional methods, it remains to be seen if it will not divert the meaning of the valuation process due to its statistical analyses. Mooya (2011) adds that AVM is threatening the survival of the valuation profession. Despite challenges to meeting standardised valuations with traditional methods, especially in developing economies, as evidenced by objections and appeals in valuations for compensation and rating valuations, respectively (Mooya, 2011; Gatheru, 2015). Tretton (2007) pointed out that AVM adoption does not bring immediate solutions to those challenges hence the need for thorough research on the technological development of how AVM can be incorporated into the valuation profession.

2.3 Implications of AVM to the Valuation Profession

Scholars hold different views on the implications of AVM to the valuation profession. Whilst Blackledge (2009), Mooya (2011) and RICS (2017) believe that valuers may be replaced with the technology hence losing their jobs, (Downie & Robson; 2007) argue that despite AVM taking a certain section of the valuation process, valuers will still be relevant in the interpretation, checking and evaluating of the AVM outputs. This view is also shared by Wilkinson, Halvitigala and Antoniades (2018), who opine that the valuation profession will still need valuers who are 'supported by analytics'. However, valuers need to rapidly embrace 'technological advancements' before becoming extinct (Ibid, 2018). Downie & Robson (2007) add that since there is a shortage of professionals in the developing world and many of those available are in their retirement age, AVM can alleviate that problem.

As pointed out by Gilbertson and Preston (2005) and Tretton (2007), AVMs reliability rests on the availability of accurate property market data, to which, in the absence of the same, AVM efficiency becomes difficult. Furthermore, it is apparent that the system still needs human input of data which means AVM still needs human personnel for efficient running. In all these instances, AVM requires professional judgement, which makes valuers vital in the process.

2.4 AVM Situation in Malawi

There is a dearth of literature on the AVM situation in Malawi, and this review relies on literature from other countries. Malawi has four city councils and six town councils (Government of Malawi, 2013). These councils are mandated to carry out quinquennial valuations to assess property values for rating purposes (Government of Malawi, 1998). However, such is not the case due to financial challenges, among other reasons, and these assessments are carried out using traditional valuation methods. One of the city councils

embarked on a project to assess properties for rating purposes within its jurisdiction using AVM, which Etter (2014) contends registered many successes since the valuation process was fast-tracked and cost-effective. Furthermore, the number of properties assessed increased from 10,000 to 40,000 and revenue collection rose tremendously by over 279% (Ibid, 2014). Despite such landmarks, the approach attracted controversy from the valuation professionals who were discontented with AVM incorporation into the valuation profession in Malawi.

3. Methodology

3.1 Research Method

The study took an exploratory qualitative method of collecting data. This method aims to establish the subjects' commonality of thoughts on the concept of adopting AVM in property valuation for rating purposes in Malawi.

3.2 Sampling

The study used a non-probability sampling technique whereby the researchers purposively sampled out registered valuers as research participants to provide insights on the subject matter. Initially, the study targeted all the 35 professional property valuers who were registered and licenced to practice property valuation in the country at the time of the study (Cloete and Chikafalimani, 2001). However, only 20 showed interest to participate in the study. These were deemed relevant and knowledgeable to meet the purpose of the study (Smith, 2009; Patton, 2002; Chilipunde, 2010).

3.3 Data Collection

The researchers conducted a total of 20 in-depth interviews with valuation professionals. The sampled participants met Creswell's (2013) and Chilipunde's (2010) recommendation that a sample size of 5 to 25 that is knowledgeable on the subject matter and is representative. There were 35 registered professional valuers in the country by the time of the study. Semi-structured interview guides were developed to aid data collection.

3.4 Data Analysis

Data were analysed using content analysis. This involved transcribing the interview contents and coding them to identify themes that were coming out frequently from the participants. The themes generated were generalised, interpreted and triangulated by an analyst to check for consistency. Emerging themes were analysed inductively (Creswell, 2013; Scuilli, 2008; Tranfield et al., 2005).

3.5 Ethical Consideration

Participants were informed of the purpose of the study and were assured that their identities and information would be classified. The information provided was kept with the highest confidentiality and was used for this study only. During data analysis, the researcher(s) ethically presented all facts as they were collected and that there was no falsification or misrepresentation of the findings or inclusion of any misleading information.

3.6 Limitation of the Study

The lack of prior studies at the local level in the subject area was the main setback in the literature review and data collection process, which helped lay a foundation for a better understanding of the study. Furthermore, the study explored the perception of professional valuers of a particular section towards the adoption of AVM at a certain point in time. This suggests that the perceptions may change with time and after going through orientation.

4. Results and Discussion

4.1 Demographic Data of the Respondents

Field data was collected through the administration of questionnaires to professional valuers who were registered members of an association called Surveyors Institute of Malawi. These practitioners are spread in all three regions of the country and work in different public and/or private sector institutions, including the Civil Service (Cloete and Chikafalimani, 2001). They are licensed to practice property valuation with the Land Economy Board under the Land Economy Surveyors, Valuers, Estate Agents and Auctioneers Act Chapter 58:08 Section 3 of the laws of Malawi. All the respondents had a first degree in Land Economy/Real Estate, and some had a postgraduate qualification in a related field coupled with practical experience between five to twenty-five years. Furthermore, the respondents had experience in valuing all types of properties. This means the respondents were conversant with the property valuation profession and were capable of providing the information required for the study.

4.2 Knowledge and Experience of AVMs

The study revealed that 77.8% of the professional valuers in Malawi knew AVM. This corresponds with Robson and Downie (2009), who found that about 80% of the professional valuers in the UK knew AVM by the time of their study. On the other hand, it was further revealed that only 15% of the valuers had practical experience with AVM. The low level of exposure can be attributed to AVM piloting in one of the local councils in the country.

4.3 Benefits of AVM over Traditional Valuation Methods

When asked about the benefits of using AVM over traditional methods, the respondents gave different understandings of AVM hence rated it differently as per each valuer's understanding. The benefits ranged from; speed, data availability; cost-effectiveness; accuracy and ease of usage. However, this study found that speed was ranked as the highest benefit of AVM over traditional methods. This agrees with Downie and Robson (2008), who found that AVM has an advantage of speed and cost-effectiveness over traditional valuation methods. However, despite AVM being modelled to incorporate the aspect of location in the property values (McCluskey and Borst, 2007) and the statistical analysis and aggregation of relevant property market data to maintain higher levels of accuracy (Rossini, 2006; Gayler, 2015), the absence of property inspection to ascertain the general condition of the property gives valuers an upper hand over AVMs (Gatheru and Nyika, 2015). On the other hand, the study found that the respondents gave a low rating on AVMs ease of usage, which can be attributed to their unwillingness to acquaint themselves with new technologies (Blackledge, 2009).

Asked further to state the level of accuracy of AVM over traditional methods, the respondents pointed out that "… AVM as an independent approach has (a) low level of accuracy since it has many short-comings". "…however…AVM cannot replace the level of skill and experience of the valuer…" The former agrees with Schuls et al. (2014) and Lipscomb (2017). They opined that professional valuers estimate the property market value by putting together all the factors that affect the value of the property. In contrast, AVMs use statistical models to predict the value, which may affect their accuracy. However, the latter disagrees with Mooya (2011, p.2267), who pointed out that *"the superiority of human valuers over AVMs, even in the so-called subjective aspects of the valuation process, is nothing if not mythical. With regard to the other elements of the valuation process, it is evident that AVMs are giving valuers a good run for their money."*

Furthermore, the respondents stated that "…if AVM was to be adopted as a supplement to the traditional valuation methods, then the performance and accuracy level would be very high, but AVM on its own has low levels of performance and accuracy". Therefore, "…AVM should be adopted as a supportive tool to traditional methods". These observations agree with Allen (2013), who found that many disagreements exist on the accuracy level of AVM. However, Rossini (2006) found that property market data and statistical analysis ensure AVM's higher accuracy. In his study, Mooya (2011) observed that valuers fear being replaced by AVM, hence the support of traditional valuation methods other than AVM.

4.4 Implications of the Adoption of AVM to the Valuation Profession

When asked to explain the implications of AVM to the valuation profession once adopted in the country, the study revealed that valuers had diverse opinions on the implications of AVM to the valuation profession. The majority of the respondents opined that "…AVM is a new concept in the country…" therefore, "…this will inevitably have its own effects (on) the valuation profession up until when the practitioners have a better understanding of it…". However, "…effects of AVM cannot distort (the) valuation process if it can be adopted as a supportive tool to the traditional methods". This concurs with studies by Downie and Robson (2007), Catt (2007), Rossini and Kershaw (2008). They found that even in countries where AVM is well established, professional valuers are sceptical of the model hence cannot fully trust the system. Furthermore, the respondents were of the view that "…if AVM is to be incorporated in the valuation profession, it has to be incorporated as a supporting tool to traditional methods other than a stand-alone method…" This view was also shared by Blackledge (2009), and IAAO (2003) who highlighted that valuation methods supplement one another hence AVM can be a supplement to traditional methods.

On the one hand, some valuers cautioned that "… AVM does not conform to the property valuation standards and should not be adopted at all because it will have negative implications on the valuation principles…." This agrees with Rossini (2008), who observed that AVM is likely to distort the meaning of the valuation process since it does not respect the rule of thumb by disregarding the property inspection stage. On the other hand, other valuers were of the view that "…if AVM is to be adopted, then it needs to be modified to conform to the local situation". This agrees with Donovan (2015,) who pointed out that AVM significant vendors in the UK, Hometrack and Rightmove, conceded that AVM's accuracy varies with situations. Hence, they cautioned the condition in which they can appropriately and effectively be used.

4.5 Acceptance of AVM in the Malawian Valuation Profession

The study further sought to determine how acceptable AVM was in the Malawian valuation profession. The study revealed that 80% of the Malawian valuation professionals were not ready and were unwilling to accept AVM in the valuation profession as a stand-alone approach to property valuation. When asked further about AVM's benefits over traditional methods, the general consensus was that AVMs are not game-changers. Sixteen of the twenty respondents pointed out that "…valuers are suspicious of AVM and its credibility as far as property valuation is concerned…" "… with this AVM, one day we will just wake up and find that colleagues from other professions are doing our work".

Furthermore, the participants pointed out that "…AVM cannot match the experience, knowledge and skill that a professional valuer possesses in estimating property values and ability to judge the property market in its current situation and condition…" However, in his study, Mooya (2011), argued that "both AVM and traditional valuation approaches are based on false ontological assumptions" hence the discussion goes beyond contrasting AVMs and traditional valuation in the existing framework.

5. Conclusion and Recommendations

Despite knowing AVM and its existence, many professional valuers in Malawi are not ready to welcome the approach in the valuation fold as a stand-alone approach to property valuation. However, a school of thought gave AVM the benefit of the doubt to be incorporated into the valuation practice as a supporting and auditing tool to the traditional valuation methods. This was based on the premise that AVM cannot stand up against the skill and experience of a professional valuer.

Although AVM is associated with many benefits to the valuation profession, for example, speed, cost-effectiveness, transparency and ease of use, Malawian property valuers are not convinced that AVMs are a game-changer to the valuation profession. This is based on the premise that valuers are afraid of losing their jobs to the non-valuer professionals who can carry out property valuation using AVM.

Furthermore, the unavailability of a central property transactions database makes it difficult for AVM to operate efficiently. This is based on the premise that property valuers hold property market data privately since depositing it in a central repository is not mandatory. Therefore, this makes the valuers the 'commanders' of the profession.

Despite literature rating AVM highly in its accuracy, speed, cost-effectiveness and performance, the Malawian professional valuers doubt the accuracy ratio of AVM to traditional valuation methods. This is due to AVMs' inability to incorporate property inspection in property valuation, hence not matching valuers' skills and experience in estimating property values. This is despite the fact that AVM is programmed to incorporate all value forming features which may also distort the property value if bad data has been put into the system.

Malawian valuation professionals are more interested in incorporating AVM as a supplementary tool to traditional property valuation methods rather than adopting AVM as a stand-alone approach to valuation. This is due to the valuation professionals' fear that AVM

will absorb the qualified valuers' job market since anybody can do the valuation using the system. This is based on the premise that only those valuers who are registered and licensed to practice with Economy Surveyors, Valuers, Auctioneers and Estate Agents Board are mandated to practice property valuation in the country; the incorporation of AVM will bring insanity to the valuation profession whereby everyone would be deemed 'qualified' to value properties without being regulated.

Therefore, this study recommends that since legal statutes regulate the valuation profession, the Malawi Government, through the Ministry of Lands must engage the professional bodies, i.e. Surveyors Institute of Malawi (Land Economy Board), to open deliberate debates within its membership and property valuation stakeholders to have a generally agreed-upon view on AVM usage in the country. Furthermore, due to technological advancements, the valuation profession cannot be left behind; therefore, the valuation profession, through the Surveyors Institute of Malawi, must deliberately put in place platforms to critically analyse the impacts of technological innovations on the profession and how they can better be incorporated into the profession.

It is a foregone conclusion that AVM has its implications in the valuation profession in one way or the other. This is the case because most of the highlighted implications of AVM depend on the mode of AVM adopted in such a particular area, together with the stability of the property market and economy. Therefore, it is of paramount importance that the best mode of AVM which can fit the local situation and conditions in Malawi based on the stability of the property market and economy is tried and tested.

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Factors Affecting Tenure Security for Legal Landholders in Urban Areas: The Case of Bahir Dar City, Ethiopia

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Abstract

Tenure security inland has been a focus for many countries and development partners to promote land-based investment. Considering *de jure*, *de facto* and the *perceived* land tenure security as a typology in tenure security, the study explores how landholders perceive land tenure security in Bahir Dar City, Ethiopia. For decades, the government of Ethiopia has tried successfully to provide *de jure* and *de facto* land tenure security in the country. The perception of land tenure security to landholders is low due to a lack of confidence in ownership. This stems from a fear of expropriation or unwilling relocation. The findings will assist decision-makers in refining their policies and decisions to increase the perception of tenure security to landholders. This will encourage landholders to invest more in their lands. This research applied a mixed research approach in data collection. Several 66 respondents, systematically selected, were surveyed and interviewed. This method was supplemented with direct observation in the case study area. To analyse the data, inferential statistics and descriptive analysis were applied to test the perception of tenure security. The findings showed that the aggregate contributions of the selected variables on the perception of fear of tenure security by landholders are significantly high. The study also revealed there are five significant predictor variables for the perception of tenure security in Bahir Dar City. In contrast to the above evidence, the results indicate that awareness of legal provision correlated negatively with security perception. These factors have negatively affected the city's physical, social, economic development and environmental management.

Keywords: tenure security, landholders, urban land, building type, plot, legal provision, security perception

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1. Introduction

The 20th century saw a massive leap in the global population, which rose from 1.65 billion in 1900 to 6 billion in 2000 (Dumont, 1993). Although, specific projections suggest that it will stabilise at 9 billion by 2050 (Dumont, 2010; United Nations, 2019). Furthermore, current figures on urbanisation show that over half of the world's population has lived in urban areas since 2007 (UN-Habitat, 2008). It is estimated that 95% of the population growth between 2005 and 2030 will be absorbed by cities in developing countries, which urban areas will have to accommodate nearly 4 billion people in 2030 (Montgomery, 2008; United Nations, 2019). With this population boom, the needs for shelter, infrastructure (physical and social), and food will escalate.

In contrast, land as the means of production for these needs will remain inelastic. Some proposals have the view that governments should formulate and provide legal and institutional frameworks that address future land challenges (Gilbert, 1994; & De Soto, 2000). In developing countries, formulating land policies that can define legal modes of land occupation, land use, and land rights is more crucial than ever.

Moreover, these land policies should aim to balance the differences between functions and allocations of land; and between different interest groups (White Paper, 2009). Over time, responses and policies for improving land tenure security have included promoting customary land rights, tenure regularisation and formalisation, incremental tenure change, policy support for adverse possessions, and the adoption of anti-eviction laws to protect informal settlement residents (UN-Habitat, 2011). However, Landholders have not felt like they have land security. Van Gelder (2009) and van Gelder (2010) have noted that tenure security can be viewed in three forms, namely, *de jure* (legal), *de facto* (societal, political institutions or customary land tenure), and *perceived* land tenure, which is the way people feel regarding the likelihood of eviction.

Currently, development policies aimed at securing urban land tenure are often based on the idea that people should receive legal title to their properties. Additionally, other authors like Larson et al. (2013); and Holland et al. (2017) believe that land titling should be massively undertaken to avoid informality in land development and harness land tenure security for landowners. However, existing knowledge on the ground shows that even people with legal-based land tenure security still face challenges related to tenure security (Adam et al., 2020; Chigbu et al., 2019; Ghebru & Fikirte, 2019; Uwayezu & De Vries, 2018). Recent publications have disclosed that challenges such as land conflicts observed in urban areas are caused by the double allocation of plots and forgery of titles (Adam et al., 2020). Eviction or forced relocation with unfair compensation or delay of compensation (Uwayezu & de Vries, 2019) are still being observed by legal landholders.

For long ago, the government of Ethiopia accepted that the lack of land tenure security hampers the investment in land, escalates land-related conflicts, and can even undermine the agricultural sector (Tsegaye, 2017). In 2000, the government tried to respond to the problems by adopting policies and putting in place institutions that could address land issues in all regions of the country, but landholders still doubted their efficacy.

For example, in Bahir Dar City, landholders do not use sustainably or invest adequately in their lands (Abebe, 2020) (Ege, 2017). They do not think of using their land titles as collateral to access credits from different financial institutions even though these institutions allow it. The worst of all that hamper landholders from enjoying their land rights is that land in Ethiopia cannot be sold in other countries, given that land is publicly owned (Gebeyu, 2013). This situation makes many landholders, particularly in urban areas, think of holding land with another person who is more influential economically and politically so that he can protect them from aggressors.

However, the factors that make landholders feel they have no land tenure security after *de jure* and *de facto* are met are missing in the existing body of knowledge. Therefore, considering the gap left by previous research on the topic, this paper explores how landholders perceive land tenure security in Bahir Dar City, Ethiopia. The paper is tailored to the following sections: background information, literature review, and methodology as pre-field and fieldwork. Then, results, discussion and conclusions as post-field work are among sections of this paper.

1.1 General Understanding of Tenure Security

Tenure security is not an object someone can provide to or take from the other. "Security of land tenure derives from the fact that a known set of rules underwrites the right of access to and use of the land and property; and that this right is justifiable" (UN-Habitat, 2004, p. 31). Payne and Quan (2008, p.24) define land tenure security as:

> The degree of confidence that land users will not be arbitrarily deprived of the rights they enjoy over land and the economic benefits that flow from it; the certainty that an individual's rights to land will be recognised by others and protected in cases of specific challenges; more specifically, the right of all individuals and groups to effective government protection against forced evictions.

In the same perspective, Williams (2011) elaborates on the concept of security of tenure as it involves legal protection against forced evictions, harassment and other threats to residents and users of property, whether or not they own it. Therefore, land tenure is concerned with individuals and groups of people, their rights, protection, and level of confidence landholders and users perceive on their properties in front of any threat.

1.2 Benefiting Through Tenure Security in Land

Development organisations at a global level, such as the World Bank and Food and Agriculture Organisation (F.A.O.), a regional level: U.S.A.I.D., UKAid and Department for International Development (D.I.F.D.) and others who are working in eradicating poverty, combating food insecurity and improving livelihoods of humankind are of the view that achieving tenure security in land and other property will help to achieve the objectives mentioned above (Abdulai et al., 2021; and Holdena & Ghebru, 2016). For example, it is acknowledged that achieving tenure security can lead to rural transformation by motivating investment in agriculture which increases manifold agricultural produce (Ghebru & Lambrecht, 2017). In

England, tenure security ascribes to the welfarisation of English people through social housing for the poor (Fitzpatrick & Watts, 2017). The message here is that not only developing countries need tenure security. Tenure security is required all over the globe for different purposes and benefits.

Moreover, Palmer *et al.* (2009) underlined the benefits of land tenure security, such as increased land-based investment by landowners, food security and sustainable use of natural resources, improved livelihoods for the urban poor, efficient inland markets; and improved health and quality of life. On the other hand, Payne *et al.* (2012) argue that people living in fear of eviction are less likely to realise their full potential as workers or as citizens and are unlikely to invest in improving their land, homes and their neighbourhoods. This shows that land tenure security by landholders is crucial for development. Generally, a secure perception of land held gives the owner peace of mind, allowing the landholder to think out of the box for innovation and creativity and invest much effort (cost and time) for sustainable land exploitation.

1.3 Perceived Land Tenure Security Among Other Types of Land Tenure Security

As previously highlighted, land can be associated with various tenure security forms that landholders can use either individually or collectively (Norwegian Refugee Council (N.R.C.) & International Federation for Red Cross (I.F.R.C.), 2013; and Ghebru, 2015). Typically, land tenure security can be guaranteed by having legal documents (titles/certificates of ownership) delivered by a competent authority (*de jure* or legal land tenure security). This protects landholders from arbitrary evictions. Another type of tenure security may be provided by society or political institutions that accept and recognise the land ownership without legal documents provision; *de facto* (Customary) land tenure security (D.U.M.O.N.T., 1993; van Gelder, 2009). In Africa, this form (*de facto)* is primarily found in many rural and peri-urban lands where land is inherited from one generation to another or land allocated by traditional leaders. The landholder has confidence in this holding because the society and existing leadership recognise it. Lastly, there is a perceived land tenure, which is how people feel regarding the likelihood of eviction, the attempt at spatial disintegration, and the eruption of land disputes (Ghebru and Lambrecht, 2015). Generally, perceived land tenure security pays less consideration to the legal titles or support from existing social and political systems but instead combines the two (de Souza, 2001; Ma et al., 2015).

This means that many landholders may own land with *de jure* or *de facto* land tenure security. However, they may still feel or perceive their land tenure security inadequately in case the government wants the land, with *de jure*, where classical cadastre is still in use, land-related conflicts that may be avoided such as double allocation of plots, delay in legal documents provision; and disputes related to boundaries of a neighbouring plot. Furthermore, ambiguous policies, regulations, and land commissions with overlapping authorities that sometimes contradict challenge land tenure security in most developing countries (Mwaikambo & Hagai, 2013); Adam et al., 2020). For *de facto*, conflicts related to ethnicity, regionalism, and unstable political systems can seriously affect the land tenure security of this type, given that one group may deny or deliberately challenge the validity of land ownership for one group to the

detriment of another group. This has happened in countries like Burundi[7] and Rwanda,[8] where land was taken from one ethnic group by the government to another after a civil war, and inversely, be re-taken after decades in a subsequent civil war (European Network for Central Africa [E.N.C.A.], 2017). This situation has pushed many people who can afford to register their land in Burundi and Rwanda[9] to undertake a massive land registration. However, this is not the end, given that the land sector is still facing some social, economic, political and environmental challenges related to land tenure security to landholders (Ali et al., 2019; Chigbu et al., 2019; and E.N.C.A., 2017). The perception of having inadequate land tenure security can negatively impact the proper exploitation of the land leading to fertile land indirectly becoming marginal land.

1.4 Perceived Land Tenure Security in Global South and Global North

The literature shows that perceived land tenure security has played a significant role in motivating farmers to invest much for increasing production. In China, it is revealed that "households that consider land certificates as important for protecting land rights invest significantly more in irrigation canals construction and maintenance" (Ma et al., 2013, p.301). In Thailand and Vietnam, landholders with insecure land tenure always plant perennial crops to convince people that it is their land (Neef et al., 2000). These crops can take time on the same piece of land that should be used for other seasonal crops. Then, they can even apply for legal land holding through registration (Wannasai & Shrestha, 2008). On the other hand, those who feel secure on their lands typically grow seasonal crops that are primarily economic and fast cash remunerable. What can be underlined is that perceived land tenure security has its own contribution to land development and livelihood improvement.

In Buenos Aires, Argentina and Bandung, Indonesia, van Gelder (2009); Reerink & van Gelder (2010), respectively, have analysed the relationship between legal tenure security and perceived tenure security towards housing improvement. The findings showed that with enhanced perceived tenure security, individual urban dwellers improved their houses by mobilising financial and technical resources that are locally available. Other projects were

[7] The civil war happened in 1972, Hutus were killed and others fled to neighbouring countries; their land was taken by the government and be given to Tutsi community members. After signing the Arusha Peace Agreement, refugees returned back and retook their land either by agreement facilitated by National Commission of Land and Other Assets (CNTB) or through judicial courts.

[8] The civil war of 1959 took the lives of many Tutsi and others pushed to flee the country. Their land was taken by the government of that time led by Hutu. After genocide against the Tutsi of 1994, the Tutsi re-took their land + Hutus land in what was called “Kubohoza” in local language.

[9] The Rwandan Constitution of 2003, the National Land Policy of 2004 and the Organic Land Law of 2005; all these legal frameworks supported legal land ownership to respond to land related conflicts that were intensifying. Then, Land Tenure Regularisation (LTR) programme to register and administer land ownership in Rwanda was initiated from 2009. It is reported 10.4 million of parcels have been recorded, 7.6 million titles collected by land owners (Schaefer, 2017).

postponed through prioritising housing services while housing-related projects were undertaken. Similarly, Nakamura (2016) used another approach to find out the link between perceived tenure security and housing improvement in slums. The results showed that the perceived tenure security is the basis of improving informally developed settlements rather than *de facto* and *de jure* tenure security.

Meanwhile, *de jure* and *de facto* land tenure security are criticised for being expensive in processes and implementation. Also, they are attributed to modernisation that ignores the local reality and traditional values. However, in their analysis, Nakimura and Gelders do not see *de jura* and *de facto* as solution providers but problem creators by welcoming derivative land-related challenges.

Moreover, Chigbu et al. (2017) disclose perceiving land tenure insecurity as evident in developing countries for urban lands. However, many private and public projects take place on these lands despite the uncertainty of future ownership. Chigbu et al. propose that developing countries need tenure security responsive to land management. Ghebru & Fikirte (2019) showed that perceived land tenure security has no gender bias. In African countries, men and women feel insecure in land held even though they have some titles and are supported by the authorities. Many assumptions on this state of affairs can be formulated, such as the fraud that can arise in legal documents — if the cadastre system is still paper-based as it is observed in many developing countries — delays of land-related cases in courts, and the prevalence of corruption injustice and other land-related offices such as nepotism and favouritism. Besides, fraudulent and fake documents can be produced and validated by competent authorities without the knowledge of the legal owner. All aforementioned can make people lose hope and trust in legal documents and systems. Given that perceived tenure security is directly linked to a socio-psychological perspective, it is apparent that it has become one of the supporting options for many landholders in developing their lands.

1.5 Perceived Tenure Security and Motivating Factors

Gaining self-confidence on the owned property is something that landholders would have to afford peace of mind and start enjoying the land, and the fruits gathered from it (Payne & Quan, 2008). However, most landholders in developing countries doubt the existing legal and institutional frameworks even though they are presented in significant numbers (Turimubumwe, 2021), especially when land gains value in a particular location. Policies and other related regulations on land may exist but not be adequate to cover crosscutting land and property issues. The same for institutions; they may exist but cannot fulfil their responsibility due to various challenges (Adam et al., 2020).

Location and building type also can affect the perception of tenure security. There is an assumption that location and building types have meaning to landholders when it comes to tenure security. Landholders who hold land in the Central Business District (CBD) and other prime lands where the values of land and property increases are always living in fear of expropriation or pressure of involuntary relocation to the periphery (Jimenez, 1983; Feldman & Geisler, 2012; and Dires, et al., 2021). Furthermore, land use types can be attached to locations where land value and prices are linked to selective use. This implies that land located

in CBD or other prime land areas have high prices with multiple uses, which sometimes require capital and specific architectural requirements (El-Barmelgy et al., 2014). Those who do not fulfil the aforementioned elements lose confidence, leading to insecurity even though they have titles and certificates. In an African context, achieving social protection in the neighbourhood where neighbours can talk on your behalf has significance in perceived tenure security. Being recognised as a settler of a specific neighbourhood in terms of decades is something valuable in enhancing tenure security (Darshini, 2010). This relates to settlement durability, which means that, in most cities, CBDs are the oldest areas where land conflicts are rarely observed, given that social linkages determine the issue of ownership. However, due to relocation caused by socio-economic dynamism, it is difficult to find old settlers in CBDs in some cities.

Mwaikambo and Hagai (2013) note that in developing countries where policies and institutions dealing with land exist, they are sometimes unfocused or are overlapping. On the other hand, institutions concerned with land management may exist. Still, they may be challenged by the financial, human and technical capacity to offer services to landholders, including tenure security and property rights (Adam et al., 2020). Moreover, landholders have been blaming legal and institutional frameworks that are not properly working to provide land tenure security. Finally, in some countries, especially in developing countries, policies and institutions may exist, but landholders are not informed about their existence. Experience shows that even local people — dominated by women — do not know the location of land offices, land officers and lawyers who can assist them in the event they face land-related challenges. Lack of awareness of adopted policies and nominated institutions are among the problems that illiterate people face to protect their land and properties (Cotula et al., (2004); Byamugisha, 2016). The authors are of the viewpoint on how the government can create awareness sessions about policies and adopted laws to ensure that local people are informed about legal and institutional frameworks in collaboration with development partners and civil societies.

1.6 Tenure Security in the Context of Ethiopia

The right to ownership of rural and urban land and all-natural resources are exclusively vested in Ethiopia's state and the people (the Federal Democratic Republic of Ethiopia, 1995). It is stated that both federal and regional rural land laws, rural land use rights of peasant farmers, semi-pastoralist and pastoralists shall have no time limit (F.D.R.E., 2005; A.N.R.S., 2017) and are permitted to transfer their holding use rights through donation and inheritance for those who have use rights. In addition to that, Urban Lands Lease Holding Proclamation defines "lease" as a system of land tenure by which the right of use of urban land is acquired under a contract of a definite period (F.D.R.E., 2011). The maximum leasehold period is 99 years to construct residential houses, science and technology centres, research centres, government offices, charitable organisations and religious institutions. In comparison, the minimum duration is 15 years for urban agriculture (F.D.R.E., 2011).

Land rights available to citizens in Ethiopia include the right to alienate, bequeath, and, where the right of use expires, remove his property, transfer his title, or claim compensation for it. However, if these rights, in some cases, are kept in offices due to many grievances, conflicts and claims that are observed in the land sector, they will not be hidden from public view. People seem not to be secure on their lands, especially when it comes to any proposal of land

acquisition or expropriation in fear of unfair compensation. Albeit, the law is clear. It is advocated that when the government does expropriation in landholding for public purposes, landholders can claim compensation based on legislation, for instance, F.D.R.E., (2005a). However, some Basis and Amount of Compensation stated in F.D.R.E. Proc. No. 455/2005, sub-article (1) & (2)[10] are not respected, which became a loophole and exacerbated the situation of landholders perceiving their land tenure security inadequately. All of these articles and others are related to land tenure security for landholders in Ethiopia. However, many landholders are not generally secure because they either do not know these legal texts or know their existence but are missing their implementation.

Moreover, the Constitution of Ethiopia article 40 does not allow the selling of land. In contrast, in the same article, property rights are mandatory and an obligation to all responsible authorities in their areas of jurisdiction. Therefore, it is clear that if you do not have the right to sell a property, your tenure security is insignificant. The meaning and importance of having *de jure* and *de facto* tenure security are presented as a 'white elephant' to the landholders.

2. Methods

2.1 Approach for Data Collection

As mentioned earlier, this research explores how landholders perceive land tenure security in Bahir Dar City. Therefore, the study employs mixed-research methods with an exploratory case study approach to achieve this objective. The experience shows that a mixed-method integrates quantitative and qualitative data within a single project (Creswell, 2009) to strengthen the result of the study. It is also a means of triangulating data from the case so that it may be mutually corroborated, improving the accuracy and credibility of the data; verifying results obtained from both quantitative and qualitative data (Bryman, 2012).

2.2 Techniques for Data Collection

For that reason, a desk review of existing literature on land tenure security globally and regionally complemented with legal framework as applied in Ethiopia at a federal and regional level were consulted. The content analysis mainly was applied for deducting viable empirical, theoretical and practical evidence. In the field, structured interviews and semi-structured interviews coupled with direct observation were employed as data collection instruments. The structured interview was used to generate information from landholders on their perception of land tenure security in general. Open-ended questions were formulated and addressed to landholders. Segments of inquiries related to reasons of perception insecurity, fear of institutional capacities and legal loopholes on supporting landholders in case of trespass, expropriation or eviction were formulated. Subsequently, a semi-structured interview question

[10] According to the proclamation (FDRE, 2005a). an urban landholder whose landholding has been expropriated under this Proclamation shall be provided with a plot of urban land, the size of which shall be determined by the urban administration, to be used for the construction of a dwelling house; and; be paid a displacement compensation equivalent to the estimated annual rent of the demolished dwelling house or be allowed to reside, force of charge, for one year in a comparable dwelling house owned by the urban administration.

was conducted to selected landholders who have building types dominated by mud, G.F.[11]+0 H.C.B.[12] , to know the reasons behind not developing the plots and how they perceive their land tenure security. Generally, questions related to reasons pushing them to lose their landholding rights, the adequacy of legal provisions to protect the rights of the landholders, and the institution's capacity to give sufficient services to the landholders were administered. This method has helped gather more responses from individual landholders and dig deeper into the issue related to the perception of land tenure security in the case study. Finally, direct observation has been employed to confirm the available types of individuals' buildings and land use types in Bahir Dar. From there, categories of building levels and land use types were distinguished.

2.3 Sampling and Data Inquiry

The urban expansion and its impacts on land use in Bahir Dar City are alarmingly increasing. For the purpose of quantitative and qualitative data, this study classified the expansion and land use land cover changes in three districts (CBD, intermediate, and periphery). The unit of analysis for this study is landholders who legally own land.

Therefore, the study used a probability sampling approach with a multi-stage combined with a cluster sampling method to determine a sample size from the city to the neighbourhood level. In the first stage, the city was divided into three districts based on the first clustering criteria: settlements in CBD settled before 1957, a recent settlement established between 1957 – 1994 (within 37 years), and periphery or new settlement from 1994 to 2019 (within 25 years of new settlement) that settled after 1994 (see Fig. 2). The CBD was selected among the three districts to conduct our study because it contains all the needed data for the study. In the second stage, buildings in the CBD, which are residential, commercial and public offices, were selected. This study did not consider other uses like religious, cultural and undeveloped plots. The buildings were selected based on their construction building materials and ground floor levels in the third stage. Thus, buildings built in mud, GF+0 HCB, GF+1-2, GF+3 and above GF+3 [13]and their use types were identified using purposive sampling methods, which is a nonprobability approach. Precisely, 22 landholders from each building type (mud, GF+0 HCB, GF+1-2, GF+>=3) for residential use, 22 commercial building owners from each building type; and 22 service building owners from each building type were samples used for this paper. Therefore, a total of 66 respondents were consulted for the survey by using questionnaires and interviews.

Before carrying out the survey, we performed a pilot study in each district. During the pilot study, final modifications were made to some questions. The participants were approached on a door-to-door basis. The next step was to formulate questions for the interview based on the conceptual framework to be addressed to landholders in Bahir Dar city so that the hypothesised

[11] GF: Ground Floor

[12] HCB: Hybrid Composite Beam

[13] Ground Floor + Floor 1, 2,3. known in construction for multi-story houses

independent variables could be measured. Participants were asked various questions to measure how these independent variables are related to their personal opinion about tenure security and the general perception of their land tenure security. The items' institutional capacity' and 'perception of security' were measured using five-point scales from 'strongly disagree' to 'strongly agree' with the same participants.

2.4 Data Analysis

This paper uses S.P.S.S. software to analyse data collected from the questionnaires, and the results are described quantitatively. Then, the significance of the correlation of variables on tenure perception, a variance of tenure security perception, a stepwise regression of variables, and factor analysis of variables was undertaken to determine the level of tenure security perception of landholders in the case study.
A critical examination of respondents' personal perceptions about land tenure security was done for qualitative information, and the results were underlined. Interviews are analysed through a narrative analysis method using a cyclical terms process. The application of this technique and process for qualitative data analysis is advised by the Academy of Educational Development (2006) and the U.S. General Accounting Office (1992), particularly when there is mixed data.

3. Results

In this section, the results of the statistical analyses are presented. Following the numerical representation of the results of the different analyses, verbal explanations and interpretations of the results are given.

3.1 Descriptive Statistics and Zero order Correlation

One of the purposes of this research was to examine the relationships of security perception with the independent variables treated in the study.

Table 1: Descriptive Statistics and Zero-order Correlation Among the Variables in the Study (n=66)

	Mean	Std. Deviation	Location of parcel	Land-use Type	Building type	Settlement duration	Awareness	Inadequacy	Confidence	Institutional Capacity
	2.18	.822								
Location of parcel										
Land-use type	2.00	.822	-.250*							
Building type	2.27	1.121	-.144	.278*						
Settlement duration	1.34	.606	-.375**	.141	-.385**					
Awareness	3.16	1.067	.061	-.195	.252*	-.002				
Inadequacy	2.77	1.087	.063	-.097	.224	-.109	.297*			
Confidence	3.14	1.407	-.009	-.145	.416**	.479**	.096	.185		
Institutional Capacity	7.12	1.683	.084	-.203	-.342**	.312**	-.042	-.257*	.359**	
Perception of Security	12.97	6.285	.004	-.103	.738**	.517**	-.293*	-.371**	.573**	.477**

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

From the Table 1, the Pearson correlation coefficients indicated that security perception was related significantly with building type (r= 0.738, p, alpha, 0.01), settlement duration (r= 0.517, p, alpha, 0.01), Awareness of legal provision (r= -0.293, p, alpha, 0.05), Inadequacy of legal provision (r= -0.371, p, alpha, 0.01), confidence of individual landholders (r= 0.573, p, alpha, 0.01), and institutional capacity (r= 0.477, p, alpha, 0.01).

The results in Table 1 indicated that the type of buildings individuals have would relate to their security perception. Individuals with mud houses tend to feel less secure about their land tenure than individuals with H.B.C. building types. Their level of security perception increases as the type of building increases its size/ complexity. Similarly, the length of the settlement also increased the level of security, where the longer people lived in that area, the more secure they felt. Confidence of individual landholders was the other worthily considerable variable that significantly and positively correlated with perception of security. The implication here is that when the landholder's confidence becomes high, the more they feel secure on land tenure. In addition, institutional capacity was also an important variable that significantly and positively correlated with the perception of security. In other words, when the institution provides appropriate services in land certification and titling, grievances and disputes arbitration, and

there is adequate human and material capacity to render the aforementioned services to the dwellers, it enhances an increase in tenure security of individuals.

On the other hand, the inadequacy of legal provision significantly and negatively correlated with the perception of security. This means the more people feel that the legal provision is not adequate, the more they perceive insecurity. Similarly, awareness of legal provision correlated negatively with security perception, although the results were significant at a 0.05 confidence level. Moreover, overall, respondents tended to perceive land tenure security negatively. In the interview, the perceived land tenure security for those landholders whose buildings are made in mud and G+0 HCB[14]openly expressed their worries that they could be evicted or expropriated by the government or be obliged to sell their land.

3.2 The Effects of Independent Variable

Since the significant task of the research was to investigate the effects of the independent variables on the dependent variable, namely perception of security, a multiple regression analysis was employed.

Table 2: The Effects of Independent Variable (i.e. "Confidence", "Location", "Awareness", "Inadequacy", "Land-use Type", "Institutional Capacity", "Building Type", and "Settlement Duration") on Dependent Variable of "Perception of Security" (No. =66)

Model		**Unstandardised Coefficients**		**Standardised Coefficients**	**T**	**Sig.**	**R^2**
		B	Std. Error	Beta			
1	(Constant)	21.927	4.119		5.323	.000	.743
	Institutional Capacity	.528	.282	.141	1.872	.066	
	Location	-.202	.588	-.026	-.343	.732	
	Land-use Type	-.315	.598	-.041	-.527	.600	
	Building type	2.772	.501	.486	5.538	.000	
	Settlement duration	1.873	.939	.180	1.994	.050	
	Awareness	-.801	.429	.133	1.866	.067	
	Inadequacy	-1.021	.413	-.171	-2.471	.016	
	Confidence	.840	.365	.188	2.303	.025	

**F= 22.779, $df_1=8$, $df_2=66$, $p=0.000$*

[14] See footnotes page 71

As can be seen in Table 2 the independent variables jointly contributed 74.3% in the variance of security perception ($r^2 = 0.743$, p= 0.000). The analysis further indicated that building type (beta= 0.486), Individual Confidence (beta= 0.188), Inadequacy of legal provision (beta= -0.171), settlement duration (beta= 0.180), awareness about legal issues (beta= 0.133), and institutional capacity (beta= 0.141), were the significant predictors of perception of security. The remaining variables, namely land use type of a parcel and location of a parcel, failed to significantly predict the residents' security perception about their land tenure in Bahir Dar. In order to sort out the significant predictors and their weighted contribution, further, a stepwise regression analysis was carried out.

3.3 Stepwise Regression Analysis of the Independent Variables

The research extends the analysis by undertaking the regression analysis to identify which item increases the tenure security perception.

Table 3: Stepwise Regression Analysis of the Independent Variables on the Dependent Variable (Security Perception)

Model		**Unstandardised Coefficients**		**Standardised Coefficients**	**t**	**Sig.**	**R^2**	**R^2 Change**
		B	**Std. Error**	**Beta**				
1	(Constant)	22.602	1.128		20.040	.000	.564	
	Building type	4.280	.450	.751	9.508	.000		
2	(Constant)	25.252	1.234		20.462	.000	.642	.078
	Building type	3.530	.454	.619	7.780	.000		
	Confidence	1.382	.355	.309	3.888	.000		
3	(Constant)	28.017	1.462		19.169	.000	.687	.045
	Building type	3.369	.430	.591	7.827	.000		
	Confidence	1.248	.338	.279	3.696	.000		
	Inadequacy	-1.297	.415	-.217	-3.122	.003		
4	(Constant)	23.872	2.194		10.879	.000	.713	.026
	Building type	3.136	.426	.550	7.361	.000		
	Confidence	-917	.352	.205	2.602	.011		
	Inadequacy	-1.320	.401	-.221	-3.294	.002		
	Settlement duration	1.962	.796	.189	2.465	.016		

As indicated in Table 3, four variables were identified as significant contributors to the perception of security. These four variables jointly accounted for 77.3% of the variance of

individual security perception, of which 56.4% was contributed by building type, 7.8% by individual confidence, 4.5% inadequacy of legal provision, and 2.6 % by settlement duration. This signifies that the type of building individuals own tends to increase their perception of security. This was also confirmed during interviews where participants with G+3 [15]and above have the confidence of not being arbitrarily evicted or expropriated. "It is not easy to evict or expropriate such a building," said one of the participants during the interview. "It can cost the municipality much", the interviewee added. This shows how building types play a significant role in providing perceived tenure security coupled with *de jure* and *de facto* land tenure security.

3.4 Factor Analysis

Factor analysis was run using principal component analysis to determine whether security perception is unidimensional or multidimensional.

Table 4: Factor Analysis of Security Perception Using Principal Component Analysis

Items	**Factors**
Item 11	.864
Item 9	.821
Item 10	.806
Item 13	.793
Item12	.770

The result in Table 4 indicated that all the items loaded on one factor suggest that perceiving tenure security is a unidimensional variable since each one is straightforward to affects the tenure security independently. The factor contributed 66.923% of the variance in perceived land tenure security. This research also proceeded by exploring other factors that may affect the perception of security or otherwise by applying qualitative inquiry.

3.5 Legal Provision, Institutional Capacity Vis a Vis Land Tenure Security Perception

The inadequacy of legal provisions contributes to the perception of insecurity regarding their land tenure. The results collected show that landholders are worrying about the leasehold practice, which specifies that land for residential land should be leased for 99 years and commercial 70 years, vague legal statements on land such as "public purpose" inland expropriation; cronyism in land allocation and favouritism were also mentioned in the first

[15] Ground floor plus three floors

stance as drawbacks of a legal provision. Inadequacy of legal provisions on urban land security was viewed by 43/66 respondents (68.2%) as among the threats to their land security.

Challenges such as inadequate qualified human resources, equipment and financial resources, a top-down approach in land management were identified by the land officers during interviews. Furthermore, respondents added to the list of challenges: corruption, inadequate development control, and delays in certificate and title delivery. The majority of people consulted, about 84.1%, expressed how these elements affected landholders to be in doubt about land tenure. On the side of land officers, they argue that there is a shortage of technicians and experts in different departments that may help to provide services to clients in due time. In addition, the research found during the interviews with land officers insufficient institutional capacity by those working in land offices is one of the significant problems that make landholders not perceive land tenure as secure. Land officers also identified problems related to transport means that hamper them from assisting landholders on time in case of grievances. On the other hand, clients blame land officers for not assisting them on time unless you bribe them during interviews.

3.6 Confidence in Tenure Security for Landholders in Bahir Dar City

This study tried to determine the confidence level among landholders in Bahir Dar City on land tenure security. The interview questions were formulated to get reasons behind landholders having low or high confidence. Therefore, results revealed that among 66 respondents, 30 of them (47.6%) expressed their views during interviews had low confidence due to doubt about full land ownership, land value increase, lack of money for building a multi-storey building, and existing institutional and legal frameworks. For the ownership, respondents showed that they are not the owner of land but holders. When it came to land value increase, respondents were of the view that those who have money may go and buy them or the government expropriate them for better development.

Furthermore, the respondents revealed that those with high-rise buildings are more confident in their land, which is not easy to destroy. In the same perspective, existing institutional and legal frameworks were cited as among elements that lower their confidence. Respondents accuse the existing institutional and legal frameworks of not making clear many land issues and not applying the provided ones.

Lastly, a high level of confidence was expressed by 20/66 respondents (31.7%). The main points that make them have this level of confidence are living in planned areas with legal documents, the type of buildings (G+1-G+3; G+4 and above), and land use that is in line with the government plan. The people living in the planned area expressed their confidence by believing in being compensated once the government may expropriate the land or the sale of their property at a high price due to the location. Also, those with modern and high-rise buildings were confident that the expropriation might not be automatic due to their property's legal status and value. Finally, the kind of land use was identified by some respondents as the basis of their confidence, especially those with hotels, businesses and rental housing, disclosing that the government encourages these kinds of developments for employment, service, and shelter provision.

4. Discussion

4.1 Building Type Affects Tenure Security Perception

The study explores the perception of tenure security in Bahir Dar among landholders. The results show that there is still a gap in knowing these variables that affect the perception of perceived tenure security in Bahir Dar. Out of those considered outlined variables, the significance value for "building type" is less than 0.01, indicating that the variable has the most significant contribution to the rest of the others. In addition to this, the significance values for "confidence", "inadequacy", and "settlement duration" are less than 0.05, showing that the effect of these variables also has a much more significant influence than the rest of the variables. Therefore, by focusing and working on those only five variables, the perception of tenure security can be improved significantly.

Although most studies have focused on rural and/or agrarian situations, researchers have a consensus that there is a positive relationship between tenure security and investment (Ma et al., 2013). Those who managed to build their plots with G+1, G+3 and above are confident with their perceived tenure security. Similarly, the result of this study confirmed that building investment could significantly predict the landowners' perception of tenure security about their land tenure in an urban area too.

4.2 Investment and Awareness of Legal Provisions on Tenure Security

The findings revealed that the higher the level of the building investment, the more individuals tend to feel secure about their land tenure. According to the results, individuals perceive such confidence to refer to the high and more complex building investments they have on land. The government cannot easily think of expropriation due to compensation that may be too high. Even any buyer who can think of buying the land and property may reconsider the price that may be asked.

On the other hand, Sarpong (2006) claimed that raising public awareness increases the perception of tenure security. Contrary to Sarpong's idea, the results show that awareness of legal provision correlated negatively with security perception, although the results were significant at a 0.05 confidence level. This means the more landholders are aware of the existing legal provision, the less they perceive insecurity about their land tenure security. Many landholders who know where to go and what to do if their land and properties are taken or trespassed do not worry about their perceived tenure security. One of the problems found in the case study is that landholders are not informed about land-related proclamations and other regulations. Others know that they exist but do not know the content. Others do not know where the courts are located and how private or public lawyers can assist them once their properties are trespassed or totally taken.

The results also completely contradict Julian Barnes's quote, "The more you learn, the less you fear…" (Barnes, 201, p.82; Singirankabo & Ertsen, 2020). It was supposed that landholders who are informed about legal frameworks have positive perceptions of perceived land tenure. However, this paper believes that maybe these people might not practically respect the existing

laws and rules; or the laws are not adequate enough to convince the landholders of perceived land tenure security. In the same analysis, the legal provisions are not offering the security of tenure to all. A significant number are not comfortable with the legal provisions. Their responses blame the leasehold so that they can be granted a freehold tenure system.

4.3 Existence of Legal and Institutional Frameworks Versus Perception of Tenure Security

Since the existing laws from the constitution and land-related laws and regulations do not allow land ownership but do recognise the holding of land, Ethiopians are not allowed to sell or buy land but lease land from the government. This affects how people perceive the land tenure security as incomplete, even though respondents do not provide further information on their statement about leasehold as a source of insecurity. However, Gilbert (1994), De Soto (2000), and UN-Habitat (2011) proposed to the government to provide adequate legal and institutional frameworks to harness secure land tenure to promote investment in land-based; this paper proved these assertions wrong. In our case study, legal frameworks and institutions related to land are provided at the federal and regional states level. However, still, several landholders are continuously feeling insecure about land tenure. Landholders in the case study cannot sell their land, and the government is able to expropriate land from landholders with compensation. Due to the experience of previous unfair compensations and quarrels that emanated from the process, all landholders perceive their tenure security to be in trouble when they think that the government could expropriate their land under the same conditions. During interviews, respondents expressed their worry about the implementation and enforcement of those legal frameworks and blamed land officers for deliberately delaying assisting landholders in case of land-related conflicts.

De Soto (2000) provided the existing empirical data on his five countries case study areas wherein in developing countries, the certificate of title can take more than a year to be given to the acquirer; whereas Transparency International (T.I.) & Food and Agriculture Organisation (2011), Transparency International (2015) point out that land administration has been identified as a corrupted sector. Moreover, institutional capacity has been determined, among other problems that make landholders feel insecure (84.1%). The corruption among land officers, delays in land-related service provision and poor land development and protection control make landholders feel insecure. All these confirm the worries expressed by respondents in this study during interviews. Respondents disclosed that services inland offices might take many days due to postponing your appointments. However, during the interview, landholders were not ready to directly use the word corruption or nepotism for these arrangements to access land-related services.

5. Conclusion and Recommendations

This research paper aims to explore the factors affecting the perceived tenure security of legal landholders in urban areas in Bahir Dar City. The objectives were to test the relationship between the independent variables that affect the perceived tenure security of landholders in Bahir Dar and explore the perceptions of the landholders of Bahir Dar about their land tenure security. In order to successfully attain these two objectives, the study employed both quantitative and qualitative research methods with an exploratory case study approach.

The findings show that perceived land tenure security is related significantly to building type, settlement duration, awareness of legal provision, the inadequacy of legal provision, the confidence of individual landholders and institutional capacity, respectively, with different coefficient correlations. Multi-regression analysis disclosed that these variables contributed significantly with 74.3% on perceived land tenure security by landholders in the case study. However, 'building type' contributed more considerably than others, whereas institutional capacity was last in the contribution of perception security in land tenure.

Finally, this study concludes that the feeling of perceived tenure security of landholders in Bahir Dar is not only affected by 'land-use type of a parcel', 'institutional capacity', and 'location of the parcel', but also by other factors like noise, misbehaviour of neighbours, projected road upgrading, heavy traffic and accidents. It was also noted that having legal documents on land does not ensure landholders have full tenure security. Having developed the plot to the maximum level is the only way to have perceived tenure security in the case study. Those who cannot afford to develop their plots to a maximum level still doubt their tenure security due to threats of expropriation or exorbitant prices from buyers who can push them to relocate to the periphery unwillingly. The paper finds that the challenges that Bahir Dar is experiencing in physical development, socio-economic development, and environment are contributed by some landholders' fear of tenure insecurity. Landholders are not motivated to invest more in the development of the city.

Based on the results and discussion above, the government is recommended to implement and enforce the existing legal frameworks and support technical and financial land-related institutions so that landholders can be assisted on time in case of need. The government is to collaborate with the financial institutions to smoothen the ways of accessing capital for developing the land to a maximum level for urban dwellers holding land in the CBD so that confidence in land tenure there may be increased.

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Enhanced Indoor Environmental Quality and the Link to Individual Productivity and Organisational Performance: A Scoping Review

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Abstract
This paper provides a scoping literature review of research methods that seek to measure individual productivity and organisational performance in office buildings containing enhanced green building features and initiatives that focus on Indoor Environmental Quality (IEQ).

The paper follows the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) framework and includes thirty-nine academic papers for the period 2000 to 2020. Different research instruments are discussed, including post-occupancy evaluations (POE), longitudinal surveys, and interviews. Furthermore, a narrative focuses on specific measures, including location, amenities, comfort, engagement, individual productivity, and organisational performance. This provides insight into common research approaches and highlights where lesser used research approaches could be applied in the field of green building features and initiatives (GBFIs), including the assessment of individual productivity and

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organisational performance. Key findings highlight that individual productivity was measured via self-assessment in previous research. At the same time, there has been no research that has successfully measured organisational performance within the context of GBFIs. Gaps have been identified in the literature concerning the relationship between knowledge-based building occupants and measuring/monetising the implementation of GBFIs. Implications of this research indicate that there are common approaches that highlight both strengths and, more importantly, weaknesses concerning linking GBFIs to individual productivity and organisational performance. Addressing weaknesses that predominantly encompass measuring organisational performance creates the opportunity for future research in this field.

Keywords:
green building features and initiatives (GBFIs), indoor environmental quality (IEQ), post-occupancy evaluation (POE), individual productivity, organisational performance

1. Introduction

Office workers comprising lawyers, bankers, management consultants and financial services specialists tend to be in A-grade or prime grade buildings containing GBFIs (Alker *et al.*, 2014). The success of the businesses that occupy prime office space is underpinned by individual productivity and organisational performance. Productivity in offices has shown to be difficult to accurately measure, where researchers have attempted a variety of methods (Nurick and Thatcher, 2021). Organisations assess individual productivity through either self-assessed or peer interviews or surveys. Organisational performance is comparatively easier to measure. This can be done by comparing reporting periods and/or comparing competing companies that offer similar products.

For a building to be certified green, it must contain some form of GBFI. The key GBFIs that this paper is centred around are indoor environmental quality (IEQ), which focuses on air quality, temperature, lighting, office layout, ventilation, and noise levels. The main thrust of this paper is to review the literature that examines the link between GBFIs, in the form of enhanced IEQ in green buildings and individual productivity and organisational performance. The relationship between GBFIs and individual productivity and organisational performance requires further scrutiny as green building advocates (councils and building owners) often maintain that green buildings, specifically the GBFIs linked to IEQ, yield enhanced productivity and performance (Alker *et al.*, 2014). According to the literature reviewed, this is not an entirely accurate statement, as there are findings that suggest that certain enhanced IEQ features can hinder individual productivity (Thatcher and Milner, 2012). This paper examines the research methods used to measure individual productivity and organisational performance in office buildings that contain green building features and initiatives (GBFIs). For the purposes of this paper, the definition of individual productivity is underpinned by pay, motivation, supervision and individual capability. These attributes contribute to organisational performance, which can be defined as the organisation's overall financial performance (Nurick and Thatcher, 2021). In order to review research approaches, this paper will assess the literature that collects empirical data in office contexts. The justification for a scoping literature review

is to provide a concise approach to organise previous research so that commonalities and gaps become easily identifiable to generate a set of hypotheses (Tricco *et al.*, 2016).

The emergence of the green building movement appeared relatively recently in Africa, as there are only two established green building councils (South Africa and Kenya) on the continent. The Green Building Council of South Africa and the Kenya Green Building Society were established in 2007 and 2017, respectively, while green building councils in North America, Europe and Australia were formed in the late 1990s and early 2000s. Many green building advocates within Africa have claimed, with only anecdotal evidence, that green buildings result in improved productivity. Therefore, research linking enhanced IEQ to individual productivity and organisational performance plays a pivotal role in justifying the implementation of GBFIs within the African office market. Past research on the performance of green buildings has used a variety of approaches, with post-occupancy evaluations (POEs) arguably being a popular technique where quantitative and qualitative data are gathered. POE is one of the preferred methods for determining building user satisfaction levels about specific building elements of GBFIs. This is because POEs are viewed as diagnostic tools to assist in isolating specific building-related problems so that they can be addressed timeously without further compounding building user problems (Prieser, 1995).

According to Tagliaro and Ciaramella (2016), POEs are considered beneficial mechanisms for collating data to support the refinement of the real and perceived productivity of the building occupants. There have been very few longitudinal studies with a central focus on establishing a coherent link between GBFIs and employee/organisational outputs.

There are three main types of POEs:
1. Building user survey (BUS) is a standardised instrument that assesses building occupant's perceptions of their work environment
2. POEs that focus on building operations such as water, electricity, and waste
3. POEs that focus on the financial performance of the building, which is linked to a variety of line items that contribute to a building's income and expenses.

The main gap identified is that although past research is focused on the link between individual productivity and IEQ in the form of GBFIs, there is little research (and thus evidence) to link organisational performance to enhanced IEQ as the result of the implementation of GBFIs in the workplace. The theoretical model, Figure 1, developed by Nurick and Thatcher (2021), will be used based on the consolidation of earlier models and is thus the most up-to-date. Figure 1 shows the possible linkages between GBFIs, which lead to individual productivity and organisational performance. Suppose an organisation is satisfied with its rented space and performs well financially due to improved individual productivity (increased Return on Investment). In that case, there is a low chance of them seeking new rental premises upon lease expiration. If an office building experiences lower vacancies, this reduces the building's risk profile, which will reflect lower capitalisation and discount rates, thus enhancing the building value (Nurick *et al.*, 2015). Figure 1 provides a framework that underpins identifying the key methods used and assessment measures in the scoping literature review.

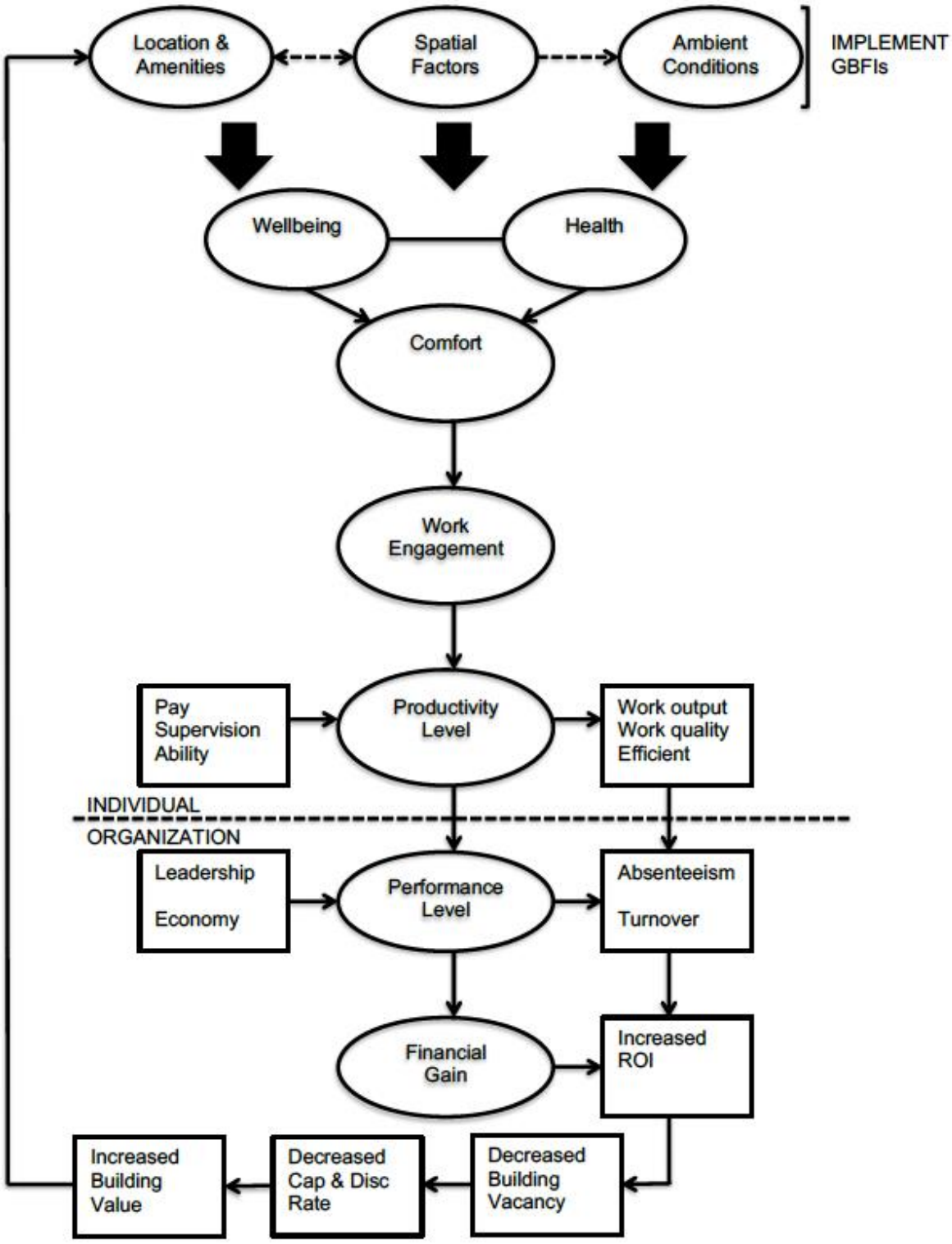

Figure 1: Linkages of GBFIs to productivity and performance (Nurick and Thatcher, 2021: 29)

2. Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) (Moher *et al.*, 2009) framework was applied, involving the four steps of identification, screening, eligibility, and inclusion. A scoping review was utilised as it provides a mapping process (Levac *et al.*, 2010; Peters *et al.*, 2015) used to identify relevant areas for further enquiry in an area where there is only emerging evidence to provide clarification for key concepts and gaps (Tricco *et al.*, 2016). On the other hand, a systematic review offers a more detailed approach that focuses on a specific research question in a relatively mature area. At the same time, a meta-analysis only refers to the statistical analysis encompassed within a systematic review. The application of the PRISMA framework allows for a transparent, logical approach that exhibits how articles were classified as included. A traditional literature review seldom provides this logical approach for the reader.

The process of identifying articles was relatively broad. The keywords of green building features and initiatives, post-occupancy evaluation, office productivity, organisational performance and indoor environmental quality were entered in Scopus and Google Scholar from 2000 to 2020. The keywords were selected as they covered a relatively broad spectrum that could be encapsulated within the scoping literature review. Additionally, some of the keywords corresponding to the theoretical framework are exhibited in Figure 1. It should be noted that a limitation of this scoping literature review is the exclusion of articles that only focus on a single GBFI, as there is potentially an exhaustive list of individual building components/features, which do not directly, or at best, very loosely link to IEQ. The reason for the twenty years is that the keywords are prominent in research areas in developed markets in the twenty-first century's first decade. This is due to the establishment of green building councils in North America, Europe, the United Kingdom and Australia in the late 1990s and early 2000s.

The search criteria were refined by intentionally focusing on peer-reviewed academic articles that specifically focused on methods for determining the impact of GBFIs on office workers. These academic papers included a variety of methods for assessing the impact of enhanced IEQ on office building occupants. Some papers applied slight variations of previous methods, while others attempted to apply new approaches to measuring individual productivity and organisational performance changes. In contrast, green building councils became more prominent in Africa and Asia circa 2010.

Over a hundred and twenty thousand journal articles were found using Google Scholar and Scopus, which contained at least one of the keywords. Two hundred twenty-five articles that contained more than one of the keywords were identified, with one hundred and eighty articles excluded at this point since they only focused on the building, not the occupants. Forty-five academic articles were screened as they contained more than two of the keywords and examined building occupants. Four articles were removed because they were literature reviews. The remaining 41 articles were considered eligible and focused on building components and/or people within simulated or natural settings. However, two articles were excluded because they only focused on IEQ and not people. This resulted in two groups of included articles (n = 39)

of people within offices (experiments, *n* = 11, non-experiments, *n* = 28). Figure 2 provides a flow diagram of the PRISMA process used in the scoping literature review.

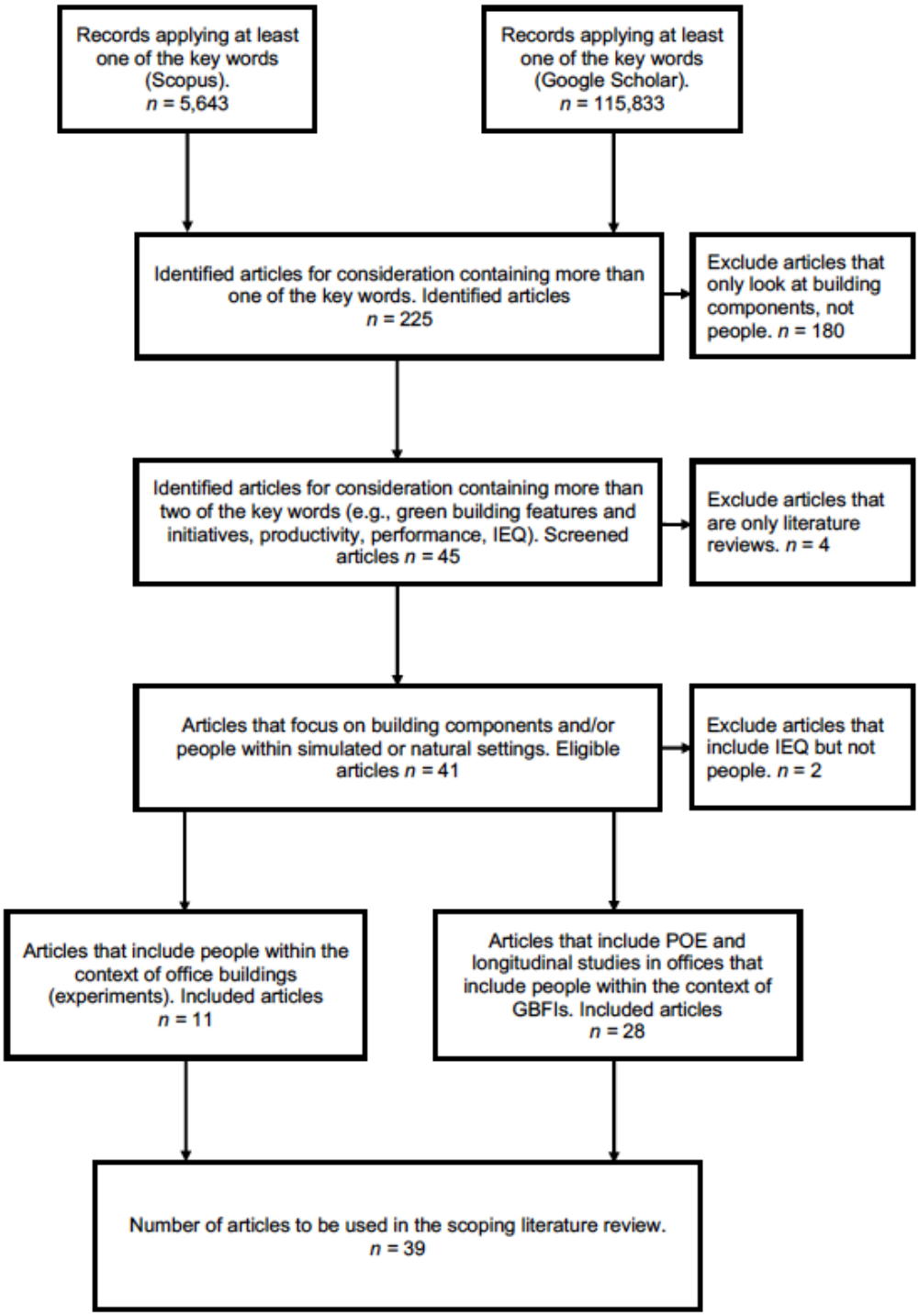

Figure 2: PRISMA Flow Diagram adapted from Sadick and Kamardeen (2020)

2.1 Selection of Studies for Review

The 39 journal articles comprising this scoping literature review used a variety of research designs. The overall breakdown of the research design for the sample included 26 (67%) articles that use some form of survey only (i.e., conventional survey, POE or BUS), 8 (21%) articles use both surveys and simulated experiments, 3 (8%) articles only use simulated experiments, and 2 (5%) articles applied interviews as a form of data collection. The sample size used by the selected articles ranged from a few hundred to several thousand. There was a variety in the measures that were chosen for analysis. As per Table 1, the data collection techniques were either cross-sectional (19 articles, 49%) or longitudinal (20 articles, 51%). However, there were some commonalities across the majority of the selected studies. This included studies focused on IEQ of buildings containing GBFIs and how this impacted the user experience, including satisfaction levels. Methods of analyses exposed a group of standard approaches, including ANOVA (13 articles, 33%), descriptive statistics (20 articles, 51%), multivariate analysis (2 articles, 5%), non-parametric statistics (2 articles, 5%) and Spearman's rank-order correlation (2 articles, 5%). Many of the findings highlighted thermal comfort, temperature, ventilation, indoor air quality (IAQ), personal control of one's environment, building aesthetics, acoustics (both general and internal partitioning) and office configuration (open plan vs shared offices vs individual cellular offices) as the common GBFIs in the selected studies. The details of each journal article are given in Table 2. The order of the articles is chronological, starting in the year 2000.

Method of Analysis	**Number**	**Percentage (%)**
ANOVA	13	33%
Descriptive Statistics	20	51%
Multivariate Analysis	2	5%
Non-Parametric Statistics	2	5%
Spearman's Rank-Order Correlation	2	5%
TOTAL	**39**	**100%**
Duration of Data Collection	**Number**	**Percentage**
Cross-sectional	19	49%
Longitudinal	20	51%
TOTAL	**39**	**100%**

Table 1: Method of Analysis and Duration of Data Collection (n = 39)

Further geographical analysis of the included articles indicated that the research was conducted across 17 countries. Most countries (14) are located in the northern hemisphere, while the remaining countries (3) are in the southern hemisphere. Most of the studies were conducted in one country; however, two of the studies researched buildings located in two countries, resulting in forty-one separate country-specific occurrences. Figure 3 shows the geographical spread of all seventeen countries.

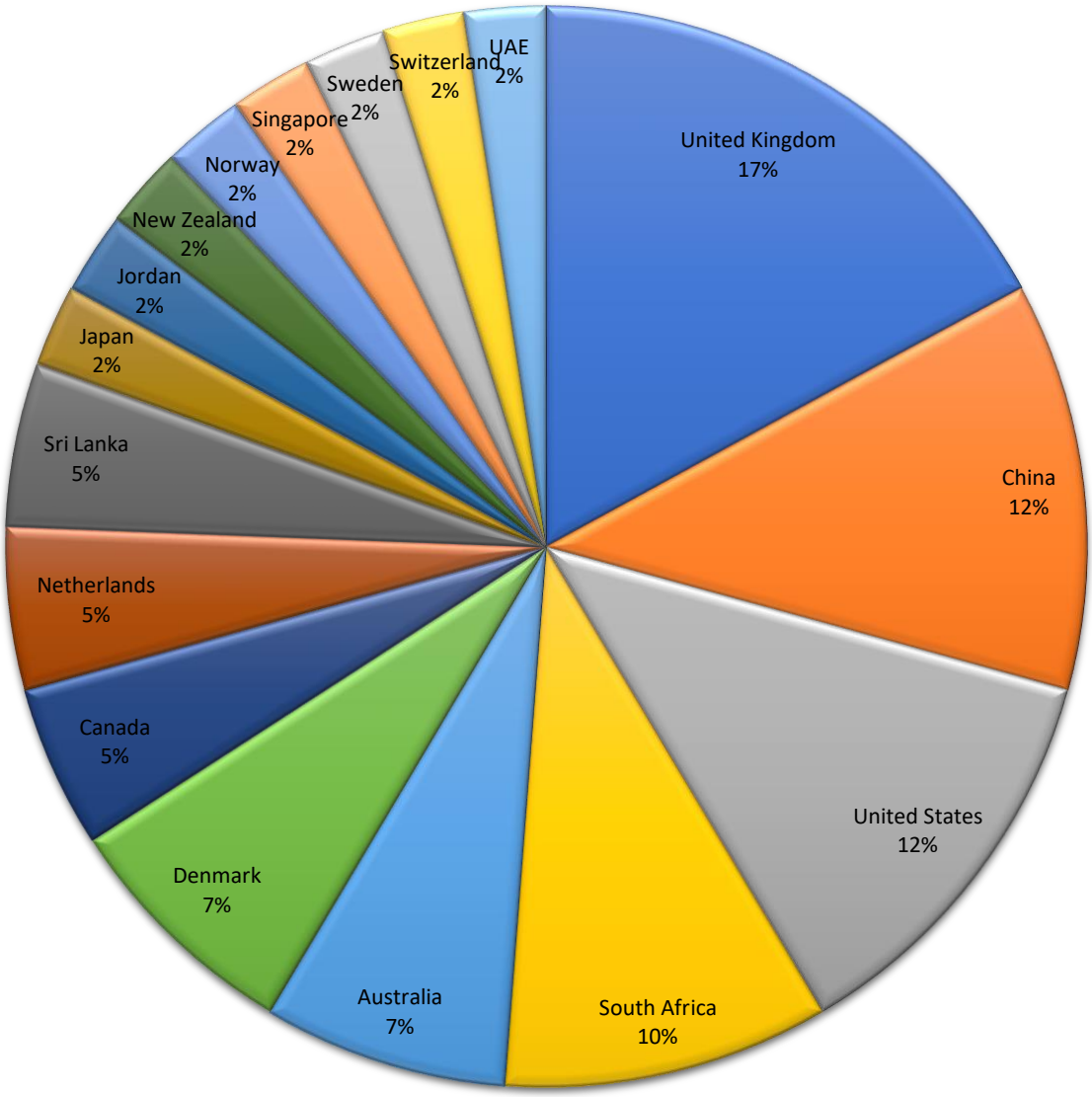

Figure 3: Geographical spread of research

2.2 Results

The results in Table 2 below are derived from research conducted in different geographical locations (North America, Europe, Asia and Africa). Table 2 provides a breakdown for each of the 39 papers in terms of research design, subject and setting, method of analysis, duration of data collection, and results. This indicates that similar findings should be considered robust and somewhat conclusive, as each of these locations experiences different climatic conditions, which contribute to office building occupant comfort levels.

Eleven articles were conducted in simulated laboratory conditions that included people but not specifically within the organisational context of GBFIs. These experiments indicated that

improving the office environment could result in improved productivity (Clements-Croome and Baizhan, 2000). These results can be extrapolated in more detail, such as removing air pollution positively impacting health and work productivity (Wargocki *et al.*, 2002; Wyon, 2004) and high temperatures and humidity adversely affecting concentration levels (Fang *et al.*, 2004).

It was established by Vischer (2007) that comfort comprised three elements: physical, psychological and functional, where all three elements contribute to individual productivity. This was confirmed by Wiik (2011), who found that physical and psychosocial environments significantly impacted productivity in an office building. Additionally, it was also found that behavioural components had a more significant influence on productivity than physical components in an office environment (Haynes, 2008).

Loftness *et al.* (2009) found that POEs benefit building occupants to assess building control, health, and productivity. In terms of office design, results indicated higher productivity levels with individual and shared offices compared to open-plan offices (De Been and Beijer, 2014). Haynes *et al.* (2017) partially agreed but noted that the configuration of open-plan offices was the main contributing factor that influenced productivity levels. However, Byrd and Rasheed (2016) stated that methods measuring perceived productivity were not sufficiently conclusive to substantiate the link between productivity and enhanced IEQ.

Leaman and Bordass (2007) conducted research that focused on comfort in terms of IEQ and their impact on health and productivity, with a specific focus on satisfaction. Results from the 28 articles contained POE, interviews and longitudinal surveys. All of these included people within the context of GBFIs. The findings indicated that generally, occupants of green buildings were satisfied with IEQ compared to conventional buildings; however, not all occupants were satisfied with enhanced IEQ, specifically the influence of comfort and control in buildings containing GBFIs.

According to Schwede *et al.* (2008), the physical attributes of an office environment that most influenced productivity were the acoustic and visual environments. The impact of green buildings on organisations and individuals researched by Kato *et al.* (2009) found that organisations tried to link GBFIs to productivity, employee retention and corporate environmental awareness. However, employees cited enhanced company image and environmental awareness as the factors that influenced their perceptions regarding GBFIs.
Research by Singh *et al.* (2010) supported the notion that green buildings with enhanced IEQ resulted in superior health and perceived productivity of office building occupants. Gou, Lau and Chen (2012) found that subjective satisfaction with IEQ improved health and productivity. However, objective building measurements indicated that green buildings were uncomfortably cold in winter, thus highlighting a possible design flaw.

Gou, Lau and Zhang (2012) found that occupants of green buildings were more satisfied with the IEQ when compared to a conventional buildings. The green building occupants perceived that they were healthier and more productive (Niewenhuis *et al.*, 2014). This was contrary to research by Gou *et al.* (2013), who found mixed results for occupant satisfaction for green buildings. Gou and Siu-Yu Lau (2013) found that green building occupants were generally

satisfied with the thermal environment. Still, contrasting indoor temperatures concerning the season was a source of discomfort. Therefore, green building design is needed to ensure satisfactory ventilation to meet occupant comfort requirements, as there is a relationship between perceived thermal satisfaction and measured individual productivity (Tanabe *et al.*, 2015).

It was established that many variables affect work productivity, especially for occupants located in open-plan office spaces (Guerin et al., 2012). Gou *et al.* (2014) stated that it was difficult to measure the impact of IEQ on office building occupants, where the main priorities were perceived health and productivity when comparing green and conventional buildings. Research conducted by Thatcher and Milner (2012) indicated contrary results, which highlighted that occupants of green buildings did not show improvements in psychological and physical wellbeing or perceived productivity. Research produced by Agha-Hossien *et al.* (2013) showed that enhanced IEQ resulted in an increase in productivity that was based on individual self-assessment. Further research by Feige *et al.* (2013) stated a relationship between the actual building and comfort levels. However, the link between comfort levels and work productivity was not fully confirmed.

Hedge and Dorsey (2013) and Thatcher and Milner (2014a) reported that IEQ factors alone did not result in occupant satisfaction. Both sets of authors continued by stating that ergonomics (i.e., physical workplace design) need to be considered in combination with IEQ (specifically thermal comfort and ventilation) to impact occupant satisfaction, health, and productivity positively. Research by Thatcher and Milner (2014) stated that although green buildings may positively impact occupant wellbeing, there was insufficient evidence to conclusively prove that green buildings result in improved health and productivity. Additional research is required to link individual productivity to organisational performance, specifically about financial gain. Activity-based work (ABW) environments/collaboration spaces require IEQ that focuses on air quality and building aesthetics, resulting in enhanced productivity, health, and building satisfaction (Candido *et al.*, 2016). This was supported by Thatcher and Milner (2016), who stated that enhanced IEQ resulted in an increase in perceived productivity and physical wellbeing. A different set of results were published by MacNaughton *et al.* (2016) in that green buildings must give the impression to building occupants of a high performing building to influence the perceptions and impact of IEQ on occupants. Mallawaarachchi *et al.* (2016), Mulville *et al.* (2016), Chadburn *et al.* (2017) and Mallawaarachchi *et al.* (2017) all, to a greater or lesser degree, highlighted individual system control as a factor that influenced IEQ satisfaction.

Green buildings generally resulted in higher job satisfaction and superior individual productivity assessments when compared to conventional buildings; however, some conventional buildings outperformed some green buildings in these metrics (Newsham *et al.*, 2017). Elnaklah *et al.* (2020) compared green and conventional buildings in terms of various IEQ factors and found that comfort was superior in green buildings, however individual productivity was slightly higher in conventional buildings, and there was no significant difference in absenteeism and presenteeism in either building type. It was established by Lee *et al.* (2020) that regardless of a green refurbishment or a new green building, the results were the same in IEQ user satisfaction and experienced health symptoms.

2.3 Measures and Variables

Table 3 below unpacks the key measures, and previous researchers used them. The last measure, organisational performance, has not been analysed in any of the chosen journal articles cited in Table 2.

2.4 Critique

Although the office environment seems to have been researched extensively in terms of the ambient environment and its impact on individual productivity, there are still areas that are either continuously re-examined or neglected altogether. The majority of journal articles used for this scoping literature review focused on the impact of IEQ on individuals in terms of their perceived productivity, thermal comfort, health and wellbeing. The applied overarching methods were POE, longitudinal studies, cross-sectional studies, and interviews.

The trends that appeared regarding measures included: user satisfaction with IEQ features such as temperature, thermal comfort, humidity, air quality, ventilation, noise, lighting, office configuration, and individual control of the ambient environment. Other non-building measures that appeared were: physical and mental wellbeing (Singh *et al.*, 2010), perception of working conditions (Thatcher and Milner, 2012), job satisfaction, absenteeism, presenteeism and perceived productivity (Thatcher and Milner, 2014b).

The most prevalent methods of analysis were descriptive statistics or some form of multiple regression. While all of the journal articles either focused on the building or individuals operating within the building, no studies predominantly focused on the organisation and how GBFIs may impact the organisation's financial performance. This was a result of past researchers not attempting to link the impact of enhanced IEQ at an organisational level or, in the case of Feige *et al.* (2013), not being able to conclusively link improved individual productivity to an improvement in organisational performance that was measured by financial gain to the company. This was hypothesised but not definitively proven.

A challenge that needs to be acknowledged is that productivity may also be influenced by non-GBFIs factors within an organisation, such as implementing new executive leadership, which may drastically change strategic and operational policies, such as IT and HR regulations. One of the main weaknesses of previous studies is that individual productivity is self-assessed by the individual and/or their supervisor, which seldom results in a fully quantifiable set of comparable outputs over a period of time. Quantitative data has been collected via laboratory studies, which artificially simulates the office environment. This approach has its disadvantages, as the research subjects are generally aware of the purpose of the experiment, which can result in skewed data.

Ideally, measuring individual productivity needs to occur over a relatively long period in the actual office environment, which usually occurs through longitudinal studies. The main challenge with longitudinal studies is that when an organisation moves from an old to a new green building, the buildings are not identical, distorting the data. The differences in buildings tend to occur due to physical elements that are not directly linked to GBFIs, such as new

internal configurations for working and resting stations (e.g., cafeteria and toilet locations). The location of the new building will impact commuting times. Additional amenities that are close or offered in the new building may impact individual productivity to a greater or lesser degree.

One of the challenges that have become apparent as a result of conducting a scoping literature review is the inconsistency concerning the assessed variables. Many variables tend to be analysed in isolation to productivity. This is often done without considering the impact of other variables within the greater context of GBFIs and individual productivity. These variables tend to include ambient conditions, spatial conditions, location, amenities, comfort and engagement. Most studies listed in Table 1 did not have a theoretical model that provides a foundation for their chosen variables. An example of such a model is exhibited in Figure 1, which shows the relationships between the variables.

There seems to be a lack of standardised approaches to measure the variables. These approaches include POE, BUS, close-ended questionnaires, environmental monitoring systems, different types of simulated office experiments and longitudinal studies. This inconsistency concerning the approach also creates difficulty when comparing results across several studies. There is additional inconsistency within the types of surveys that have been used across the different studies. This is mainly due to the time, i.e., cross-sectional vs longitudinal. A significant challenge is the inability to compare many studies, as each study seems to, at most, examine one or two GBFIs. Therefore, it may be beneficial to switch the focus solely from GBFIs to IEQ, allowing for a more high-level comparison across studies.

Another challenge is the inability to ascertain if there are commonalities across industry sectors, as most of the included studies chose not to disclose the company type to maintain anonymity. A final problem is how building(s) are incorporated into various studies. Some studies focus on one building containing GBFIs, while others attempt to compare conventional and green buildings. When comparisons are conducted, there is an additional difficulty in defining the sufficient and accurate criteria that are able to generate data that can result in meaningful conclusions. Therefore, measuring individual productivity within the context of organisational performance over a period of time in competing organisations may result in a data set that can assist in linking individual productivity to organisations' performance by providing quantifiable data to support the proposition that the implementation of GBFIs pertaining to IEQ in an office building increases individual productivity thus leading to an enhancement in organisational performance.

Some gaps require further research when comparing what has been done within the identified journal articles to the model linking GBFIs pertaining to IEQ to productivity and performance (Figure 1). There needs to be a specific focus on how knowledge-based building occupants can measure and/or monetise the implementation of GBFIs. This is a vital point, as capital expenditure by real estate companies is usually linked to some form of long-term return on investment (ROI). One of the variables that influence ROI is the vacancy rate, which is underpinned by the tenant's satisfaction with the space and/or the financial success of companies occupying the space to renew leases upon expiration. This will also impact valuation variables (discount and capitalisation rates), as is shown in Figure 1. Comparing

companies located in buildings containing GBFIs against similar companies located in conventional buildings could provide an insight into linking GBFIs to organisational performance.

3. Discussion

The benefit of a scoping literature review within this field of research is that it has provided a systematic approach to identifying specific journal articles that encapsulate office buildings, occupants, GBFIs, enhanced IEQ, and the resulting impact of several measures and variables on occupant comfort, wellbeing, and productivity. There appear to be commonalities regarding conducting research in measuring productivity in office space where IEQ has been enhanced. Additionally, there seem to be similar trends concerning the results regarding the emerging variables that have the most vital links to productivity and the indoor environment. The main findings revolve around occupants' satisfaction or comfort with the ambient environment and control thereof, focusing on air quality and temperature. The measurement of productivity is either through the supervisor (Newsham *et al.*, 2017) or, in most cases, self-assessed (Schwede *et al.*, 2008; Kato *et al.*, 2009; Agha-Hossien *et al.*, 2013; Mallawaarachchi *et al.*, 2016; Haynes *et al.*, 2017) when conducted in an organisation.

There are a variety of research designs, where the majority were cross-sectional studies, longitudinal studies, BUS, and/or POE. Most of the results highlighted office building occupants' wellbeing, comfort, and perceived productivity as the main findings across most articles classified as eligible/included. None of the studies managed to link individual productivity to organisational performance successfully, nor has this been a core research objective for the majority of the researchers in this field of study. One study attempted to find this link as a secondary component of their research (Feige *et al.*, 2013); however, the results were inconclusive. Therefore, there remains a gap in this research field, as the impact of the implementation of GBFIs, specifically enhanced IEQ, on individual productivity and its link to organisational performance (Figure 1) has yet to be established.

4. Conclusion

There is minimal focus on how GBFIs impact specific organisations or industries. Although individual employees underpin organisations, there has yet to be research linking GBFIs to individual productivity and organisational performance within an office environment. The majority of the sample of journal papers have indicated that enhanced IEQ is positively received by office building occupants, as there is, to a greater or lesser extent, an improvement in self-assessed productivity, which physical and non-physical measures have influenced. It should be noted that the main limitation of this scoping literature review includes the assessment of academic research conducted only within the last twenty years, which may indicate a bias towards certain types of research designs and methods of analysis.

5. Implications for Further Research

Several financial institutions offer products for long-term investment. Typically, these products are categorised as low, medium, and high-risk investment options. The asset allocation that

comprises these investment categories differs depending on the asset managers and the financial institution. The next step in this research area would be to quantitatively assess the impact of GBFIs, specifically enhanced IEQ, on organisational performance by comparing the same tenant type (e.g., financial services companies) located in green buildings and cross-mapping their organisational performance against IEQ scores. Financial services companies located in green buildings with different IEQ ratings can be compared with the annualised return. A further study could be conducted to determine if there is a relationship between specific IEQ attributes (GBFIs) and annualised return (organisational performance). This would provide further insight into linking individual productivity and organisational performance to GBFIs. This analysis will hopefully provide further insight into the strategy of implementing GBFIs within an office environment.

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Appendix

Table 2: Selected sample of journal articles (included *n* = 39)

Author(s)	Research Design	Subject and Setting	Method (s) of Analysis	Duration of Data Collection	Results
Clements-Croome and Baizhan (2000)	Occupational Stress Indicator (OSI) Survey.	Focus on crowded offices/physical environments, impacting job satisfaction and productivity.	Spearman rank correlation coefficient, multiple regression, F-test.	Cross-sectional	Improving the office environment could result in improved productivity.
Wargocki *et al.* (2002)	The experiment of removing air pollution sources in two buildings, where thirty subjects participated in each building.	Comparison of perceptions of work performance in an office environment when air pollution loads are changed.	Descriptive statistics, t-test, Wilcoxon test, chi-squared.	Cross-sectional	Removal of air pollution positively impacted health and work performance in an office building.
Fang *et al.* (2004)	Experiment and simulated office work of 30 female subjects.	Impact of indoor temperature and humidity on SBS and performance.	Descriptive statistics, ANOVA, Wilcoxon rank test.	Cross-sectional	Uncomfortably high temperatures (gender-specific) and humidity levels adversely affect concentration levels.

Wyon (2004)	The experiment of up to five hours of where sources of air pollution were removed in a simulated office. The experiments took place in two offices, *n* = 26 for each office.	Investigation of indoor air quality (IAQ) on occupant behaviour and productivity.	Multivariate analysis, Wilcoxon test.	Two separate eight-week experiments.	Air quality and sufficient ventilation are positively linked to occupant behaviour and productivity in an office building.
Vischer (2007)	Survey, *n* = 520 from five office buildings.	Investigating the relationship between comfort and performance in an office environment.	Descriptive statistics	Cross-sectional	Environmental comfort comprises three elements: physical, psychological and functional comfort. Personalising space is linked to psychological comfort, which can impact performance.
Leaman and Bordass (2007)	POE from 177 buildings focused on comfort, temperature, air quality, lighting, noise, configuration, health, and perceived productivity.	Dissatisfaction with green buildings, tolerance of green buildings.	ANOVA, Pearson's correlation	Cross-sectional	Generally, occupants are more satisfied. However, some of the granular data indicates some dissatisfaction with certain GBFIs.

Haynes (2008)	Analysis of two data sets. n_1 = 996, n_2 = 422. Data sets focused on comfort, office layout, interaction and distraction.	Impact of the office environment on perceived productivity of occupants.	Descriptive statistics, Factor analysis/Cronbach's alpha.	Cross-sectional	Behavioural components have a larger impact on productivity than the physical components for office occupants.
Schwede *et al.* (2008)	Analysis of 48 surveys of over 5,000 occupant self-assessments.	Occupant satisfaction with new and old workplace designs.	Descriptive statistics of quantitative and qualitative data.	Cross-sectional over four years	Physical attributes of the workplace impact productivity, which designers do not properly address. The acoustic and visual environment are the most influential factors for building occupants.
Loftness *et al.* (2009)	National Environmental Assessment Toolkit (NEAT) - assesses the efficacy of POE.	Value add of POE for building occupants and facility managers.	Descriptive statistics, ANOVA, Pearson's correlations.	Cross-sectional	POEs offer many benefits to building occupants with regard to building control, health and productivity.

Kato *et al.* (2009)	Analysis of two data sets, where *n* = 128. There were two surveys; one targeted management and the other employees.	Perceptions of office buildings occupants located in green buildings.	Descriptive statistics	Cross-sectional	Green building affects an organisation and individuals differently. Organisations cited productivity, employee retention and environmental awareness. Employees cited enhanced company image and environmental awareness.
Singh *et al.* (2010)	A longitudinal study (surveys) involving case studies where building occupants moved from a conventional building to a green building. Case study 1, *n* = 56, case study 2, *n* = 207.	Investigation into the perceived effects of a green building on occupant health and productivity.	t-test	Eight months	The data supported the notion that green buildings with enhanced IEQ result in superior health and perceived productivity of office building occupants.

Wiik (2011)	Questionnaire that converts data into an indoor productivity index (IPI). The survey included twelve companies. Three companies moved premises; nine companies refurbished premises, where n = 484.	The development of a model predicts the economic benefits of refurbishing or moving premises in terms of productivity.	Analysis of Variance (ANOVA), t-test, Pearson's correlation, Cronbach's alpha.	Pre-occupancy surveys. Post-occupancy survey - six, eleven and twenty months after moving into new premises.	Both the physical and psychosocial environments significantly impact productivity in an office building.
Gou, Lau and Chen (2012)	Post-occupancy study in the form of a BUS, where n = 182.	Subjective and objective evaluation of the thermal environment of a green building.	Pearson's correlation	Data collection occurred at the end of summer and mid-winter for six days.	Subjective satisfaction with and control of IEQ resulted in improved health and productivity. Objective measurement indicated that the building was uncomfortably cold in winter, thus highlighting some design flaws of the green building.
Gou, Lau and Zhang (2012)	Post-occupancy study in the form of a BUS for two case studies, where n_1 = 57, n_2 = 42. The survey focused on IEQ attributes.	IEQ comparison of two green buildings and a conventional building.	Case study, descriptive statistics and t-test.	Data was collected in summer and winter.	The perception of the green building occupants was that they were more satisfied with the IEQ than the occupants of the conventional building. Green building occupants perceived that they were healthier and more productive.

Guerin *et al.* (2012)	POE, where two samples were applied - calibration sample (n = 101), validation sample (n = 102). The survey focus was on occupant satisfaction and performance.	Evaluation of building occupants works performance and satisfaction focused on IEQ criteria for green buildings.	Descriptive statistics, t-test.	Cross-sectional	Many variables affect occupants' work performance, specifically for occupants located in open-plan office space.
Thatcher and Milner (2012)	Longitudinal study comparison of two groups, where n = 240. One group moved into a green building, and the other group remained in a conventional building.	An investigation to determine if green buildings actually result in enhanced physical and psychological wellbeing.	Descriptive statistics, t-test. Seven measures were analysed.	Time 1 - before employees moved into a green building. Time 2 - six months after employees moved into a green building.	Results were contrary to the industry narrative regarding the green building. The green building group did not produce a consistent result that indicated a significant improvement in psychological and physical wellbeing and perceived productivity.
Agha-Hossien *et al.* (2013)	POE, where n = 162.	Employee satisfaction regarding energy performance can be used as a predictor of perceived productivity.	Self-assessment of productivity and analysis of absenteeism data.	Pre and Post OE six months apart.	Employees were satisfied with the new work environment focused on space configuration and quality. Employee self-assessed productivity increased.

Feige *et al.* (2013)	Questionnaires, structured interviews, and physical measurements inside office buildings. The research comprised 18 office buildings where *n* = 1,500 employees.	The relationship between sustainable office buildings occupant's comfort, self-assessed performance and work engagement.	Descriptive statistics, correlation analysis.	The questionnaire and measurements occurred twice over summer and winter.	There is a relationship between building and comfort levels. The link between comfort and work performance is not fully confirmed. Linking work performance and financial gain to the company still requires research.
Gou *et al.* (2013)	BUS focused on comfort and satisfaction. The sample included nine green buildings and five conventional buildings, with total occupants of *n* = 1,251.	Comparing green and conventional buildings focuses on occupant satisfaction and comfort.	Case study, descriptive statistics and t-test.	Data was collected in summer and winter.	Mixed results for occupant satisfaction and comfort for green buildings.
Hedge and Dorsey (2013)	POE where *n* = 35 for two green-certified office buildings. The research focused on ergonomic and IEQ measures.	Investigating the impact of ergonomics and IEQ factors on health, performance and satisfaction.	Chi-squared, t-test, Pearson's correlation, factor analysis, stepwise linear regression.	Cross-sectional	IEQ factors alone do not result in occupant satisfaction. Ergonomics needs to be considered in combination with IEQ to impact occupant satisfaction, health, and performance positively.

Gou and Siu-Yu Lau (2013)	POE as a BUS was conducted in an office building, which comprised a survey (n = 182) and physical measurements.	POE of thermal environment in a green building.	Descriptive statistics	Data collection occurred at the end of summer and mid-winter for six days.	The majority of occupants were satisfied with the thermal environment. Contrasting indoor temperatures in relation to the season was a source of discomfort for building occupants. Green building design needs to ensure satisfactory ventilation to meet occupant comfort requirements.
De Been and Beijer (2014)	WODI Light online questionnaire across 87 case studies, spanned across different sectors, with n = 11,799.	Measuring employee satisfaction with the working environment, with a specific focus on office type.	Regression analysis	Five and half years.	Results indicate a higher level of productivity with individual and shared offices versus larger open-plan offices.
Gou *et al.* (2014)	BUS comprising 14 buildings where n = 1,251 occupants. The survey focused on temperature, light, noise, perceived health and perceived productivity.	Green building IEQ satisfaction which can impact office occupant comfort, health and productivity.	Analysis of Variance (ANOVA), F-test, Pearson's correlation.	Data was collected in summer and winter.	Difficult to measure the impact of IEQ on office building occupants. Perceived health and productivity are highest compared to conventional buildings for occupants

					located in highly rated green office buildings.
Niewenhuis *et al.* (2014)	Longitudinal study which focused on workplace satisfaction, concentration, air quality and subjective productivity. A sample of $n = 67$.	The introduction of green features in an office building. Measuring the difference in occupants in terms of wellbeing and productivity.	Analysis of Variance (ANOVA), chi-squared.	Three weeks	Green features contribute to employee welfare and organisational output in terms of productivity.
Thatcher and Milner (2014b)	Longitudinal study comparison of two groups. One group moved into a green building, and the other group remained in a conventional building, with $n = 41$.	To determine whether a green building results in a healthier, more productive office environment.	Descriptive statistics, t-test, F-test, chi-squared.	Time 1 - two months before moving to the green building. Time 2 - two weeks, six months after moving into the green building. Time 3 - three weeks, one year after moving into the green building.	Results suggest that green buildings may positively impact the well-being of occupants. The results do not conclusively prove that green buildings enhance the occupants' health and productivity.

Thatcher and Milner (2014a)	A longitudinal study (POE) involved moving from conventional buildings to three green buildings. The sample was: n_1 = 161, n_2 = 56, n_3 = 108. The survey focused on psychological and physical wellbeing, job satisfaction, propensity to continue working at the organisation, productivity, absenteeism, presenteeism.	Focus on ergonomics for green building that contributed to the design of the interior design rating tool.	Descriptive statistics, t-test.	Pre-occupancy survey - three months before moving into a green building. Post-occupancy survey - six months after moving into a green building.	Ergonomics has a role to play in green building design, with a specific focus on thermal comfort and ventilation.

Tanabe *et al.* (2015)	Survey of office workers n_1 = 105. The survey focused on health, indoor environment, fatigue, self-assessed performance, and usage of cooling items. Experiment and simulated office work, n_2 = 11 for the chamber.	Investigating changes in the thermal environment regarding the impact on individual productivity in an office building.	Descriptive statistics and correlation tests.	Phase 1 - four months, Phase 2 - two months.	There is a relationship between perceived thermal satisfaction and actual measured (Phase 2) individual productivity.
Byrd and Rasheed (2016)	Review of measuring productivity. Two surveys - the first focus on self-assessed productivity. The second survey included twenty-one factors that focused on environmental and social aspects in an office environment. Both surveys had *n* = 49.	Measuring productivity of green buildings within the context of IEQ.	Review of measuring productivity and a survey.	Cross-sectional	Methods of measuring perceived productivity are not conclusive to substantiate the link between productivity and enhanced IEQ.

Candido *et al.* (2016)	POE, time-lapse surveys, IEQ measurements for 65 buildings with 7,000 responses. Nine IEQ measures and four satisfaction measures:	Workplace layout and occupant satisfaction with IEQ components for activity-based working (ABW).	Analysis of Variance (ANOVA), Cohen's *d*	Cross-sectional	Building occupants were satisfied with IEQ regarding air quality, building aesthetics, perceived productivity, building satisfaction, health and collaboration space for ABW layout.
MacNaughton *et al.* (2016)	Environmental monitoring system (phase 1 and 2), survey (phase 2). Sample comprised *n* = 30 (phase 1) and *n* = 24 (phase 2).	Environmental perceptions and health before and after moving to a green building.	Univariate and multivariate analysis	Two weeks (phase 1) six days (phase 2).	Building occupants in the green building experienced enhanced IEQ. A green building must exhibit high performance and give the perception of high performance (IEQ) for it to influence building occupants.
Mallawaarachchi *et al.* (2016)	Survey and semi-structured interviews. Measures comprised self-assessment of productivity, thermal conditions, visual quality, IAQ and acoustic quality, where *n* = 65.	Examining the relationship between IEQ and enhanced productivity of green buildings occupants.	Non-parametric statistics, Spearman's correlation.	Cross-sectional	Several IEQ factors influenced individual productivity, such as air quality, acoustics and system control.

Mulville *et al.* (2016)	Survey, n = 95. Measures comprised ambient environment, air quality, temperature, humidity, noise, lighting, occupant behaviour, health, wellbeing and proximity to windows.	Examines the ambient environment on perceived comfort, health, wellbeing and productivity in an office building.	Spearman's correlation	Five weeks during the summer months.	Certain environmental factors have a greater influence on productivity, such as noise level access to systems control.
Thatcher and Milner (2016)	A longitudinal study (POE) involved moving from conventional buildings to three green buildings. Treatment group - employees moved from conventional to green buildings. Contrast group - employees remained in the conventional building. Samples comprised n_1 = 97, n_2 = 41, n_3 = 73.	Investigation into whether green office buildings enhance user experience due to improved IEQ.	Review of academic literature, descriptive statistics, t-test, F-test, chi-squared.	Pre-measures were taken three months before moving to a green building. Post-measures were taken twelve months after moving into a green building.	There was an increase in perceived productivity and improvement in physical wellbeing.
Haynes *et al.* (2017)	The survey, where n = 220. Self-assessment of productivity and an evaluation of the office environment. Focused on lighting, temperature, cleanliness, interruptions and work interaction.	Investigation into the open-plan offices focusing on if productivity benefits outweigh productivity penalties.	Descriptive statistics, Factor analysis/Cronbach's alpha.	Cross-sectional	The configuration of open-plan offices is the main contributing factor in influencing productivity levels.

Chadburn *et al.* (2017)	Close-ended questionnaire of employees in professional companies, where *n* = 213. The survey focused on seven aspects of productivity.	Drivers of individual productivity of knowledge-based workers, focusing on the physical and social environment.	Descriptive statistics	Cross-sectional	Individual productivity is dependent on the physical and social environment. The main driver of productivity is an office with good ventilation and temperature control.
Mallawaarachchi *et al.* (2017)	Survey and semi-structured interviews were used to test two hypotheses, where *n* = 65.	Examining the relationship between built environment and productivity of green buildings occupants.	Spearman's correlation	Cross-sectional	There is a statistically significant relationship between green buildings and occupant productivity regarding air quality, system control, acoustical partitioning, amount of space and open-plan office design.
Newsham *et al.* (2017)	Analysis of office building occupants (*n* = 14,569) in green and conventional buildings. Occupant productivity measures: great place to work, external value, management, happy to be here, manager assessed performance, HVAC complaints.	Analysis of green and conventional buildings. The main focus is organisational performance across the data set.	Building level - non-parametric Wilcoxon signed-rank test. Employee level - multivariate analysis of variance with covariates (MANCOVA).	Cross-sectional	Note: not all green buildings outperformed all conventional buildings. Generally, green buildings scored higher regarding job satisfaction and value to clients. Green buildings also tended to yield higher job performance

					assessments conducted by managers.
Elnaklah *et al.* (2020)	POE of five green buildings and eight conventional buildings, *n* = 502 building occupants. The focus of the study was measurement of air temperature, humidity, CO_2 concentration, individual productivity measured by absenteeism and presenteeism.	Investigation into the comparison of IEQ quality of green buildings versus conventional buildings.	Descriptive statistics, t-test, Cohen's d	A longitudinal study collected data over three campaigns over approximately 18 months.	Thermal comfort in green buildings is superior to conventional buildings. Individual productivity was slightly higher in the conventional buildings, with no significant difference between absenteeism and presenteeism.
Lee *et al.* (2020)	POE of occupants (*n* = 367) in office buildings (*n* = 14). Main measures comprised: windows view from desk, temperature, humidity, lighting level, daylight, air quality and indoor environment.	Investigation into satisfaction and health symptoms experienced by users of green refurbished office buildings compared to new certified green buildings.	Multivariate analysis, pairwise analysis	Cross-sectional across the sample of buildings that took approximately two years.	Both categories of the building had superior IEQ compared to conventional buildings. Refurbished conventional buildings to green-certified buildings exhibited similar satisfaction and health symptoms relating to IEQ to that of a new certified green building.

Table 3: Measure and corresponding application by other researchers

Measure	Application by previous researchers
Ambient conditions (IEQ/IAQ)	Multiple approaches to measuring IEQ/IAQ. Hedge *et al.* (1996) focused on temperature, lighting, glare, ventilation, internal drafts, insufficient air movement, dryness, humidity, ambient noise distraction, unpleasant air odour, stale air, dusty air and electrostatic shock in a questionnaire to assess perceptions of the IEQ in a sick building syndrome (SBS) study. This questionnaire was used by Thatcher and Milner (2012, 2014b, 2016). Another popular application for measuring IEQ/IAQ is the BUS (Gou *et al.*, 2013; 2014), which focuses on comfort, including assessing perceptions of temperature, light, noise, and air quality.
Spatial conditions	The scale developed by Thatcher and Chunilal (2015) compared workspace type and quality was conducted when an organisation moved from a conventional building to a green-certified building. This scale consists of 13 items that showed good discriminant validity and internal consistency reliability (Thatcher & Chunilal, 2015). The ergonomics theory underpins the items, including frequency of use, functionality, personal space, privacy and collaborative space (McCormick, 1970; Orborne, 1982). Candido *et al.* (2016) conducted a study that somewhat focused on spatial comfort and individual space containing seven items based on the BOSSA Time-Lapse IEQ questionnaire. Mallawaarachchi *et al.* (2017) partially looked at spatial quality. The focus was on personal control workstations, distractions, privacy, office instrumentality, space arrangement, office orientation and space flexibility, based on similar items that were identified by Heerwagen (2000).
Location and amenities	Currently, no validated scale exists to assess satisfaction with location and amenities. Therefore, a scale will be developed and pilot-tested that assesses the critical amenities as identified by Alker *et al.* (2014). A draft version of possible questions was included as an Appendix to the Alker *et al.* (2014) report, but this has not been empirically tested. The questions that focused on location pertained to the office's proximity to different transport routes, nodes and commute times. The questions that focus on amenities include showers, storage facilities for bicycles and clothes, quality of food at the office, and proximity of external amenities such as shops.
Comfort	A POE was deemed an appropriate tool for assessing comfort by Bordass and Leaman (2005) as it provided a feedback mechanism. Therefore the following researchers listed in T-table 1 applied a POE and/or a BUS: Leaman and Bordass (2007); Gou, Lau and Chen (2012); Gou and Siu-Yu Lau (2013); Gou *et al.* (2013); Thatcher and Milner (2014a); Elnaklah *et al.* (2020). Another method of measuring comfort was to conduct simulated experiments that intentionally changed the indoor environment (Wargocki *et al.*, 2002; Fang *et al.*, 2004). Feige *et al.* (2013) assessed comfort by applying questionnaires, structured interviews and conducting physical measurements within an office. Mulville *et al.* (2016) and Chadburn *et al.* (2017) used questionnaires that included comfort as a measure. According to Vischer (2007) and Laughton and Thatcher (2018), discomfort is categorised as physical or psychological. Psychological comfort was assessed through Laughton and Thatcher's (2018) self-developed 6 item scale. The scale showed good internal consistency

	reliability in a previous study. Physical comfort was measured using the SBS questionnaire from Hedge *et al.* (1996). There were 15 items on this scale, and it was assessed using a 4-point scale ranging from never (4), 1-3 times per month (3), 1-3 times per week (2), and every day (1). Good internal consistency reliabilities have been reported on subsequent administrations of this scale.
Engagement	Feige *et al.* (2013) attempted to measure work engagement using descriptive statistics and multiple regression by trying to identify a correlation between engagement, environmental features, IEQ, SBS, work performance and organisational citizenship behaviour. This was based on the mental state of employees, which is underpinned by vigour, dedication and absorption (Demerouti and Bakker, 2008). The scale created by Schaufeli *et al.* (2006) focused on vigour (high energy levels and mental resilience), dedication (high involvement levels and enthusiasm) and absorption (high concentration levels). Utrecht Work Engagement Scale (short version), nine items (3 each for vigour, dedication, and absorption) measured on a 7-point Likert-type scale from "never" to "always". These scales were based on a previous study by Schaufeli *et al.* (2002) using the Maslach-Burnout Inventory-General Survey (MBI-GS), where engagement and burnout were analysed.
Individual productivity	Absenteeism and presenteeism are viewed as potential indicators of productivity (Roelofsen, 2002; Danielsson and Bodin, 2008; Thatcher and Milner, 2012; Agha-Hossien *et al.*, 2013; Thatcher and Milner, 2014b; 2014a; Elnaklah *et al.*, 2020). Self-assessed productivity is another approach to determining productivity levels, where respondents were asked to rate their perceived productivity on a scale from 0-to 100% within the context of their full capacity (KPIs) (Thatcher and Milner, 2012). Another more structured measure of productivity is by conducting psychometric tests, which use different reasoning tests containing quantitative and qualitative assessments (Byrd and Rasheed, 2016). The BUS also requires self-rating of productivity, which used a scale ranging from decrease (-20%) to increase (+20%) (Gou *et al.*, 2013). Another version of the BUS measured perceived productivity using a 7-point Likert scale ranging from "less productive" to "more productive" (Gou *et al.*, 2014).
Organisational performance	No previous researchers were able to establish a link between GBFIs to both individual productivity and organisational performance. Therefore, there are no commonly used items to assess this measure within a knowledge-based office environment.

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