

IMPACT OF DIGITALISATION ON REAL ESTATE FIRMS PRODUCTIVITY: REVIEW OF LITERATURE AND CONCEPTUALISATION

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Abstract: Digitalisation is the integration of Digital Technologies (DTs) into daily life and the impact of these technologies on how work is accomplished. A significant amount of empirical research has been undertaken in relation to digitalisation and its impact on real estate practices globally. Nonetheless, there is a dearth of scholarly research on review and conceptual studies on the subject matter. This article reviews the literature on digitalisation's impact on real estate firms' productivity. Although findings from previous studies indicated a beneficial association between digitalisation and productivity in human resources, the trend of the literature. However, there is a lack of scholarly studies on the impact of DT availability, awareness, and use on real estate firm's employee productivity. A conceptual framework was developed hypothesising that DTs' availability and use directly affect employees' productivity and that digitalisation challenges and drivers moderate those effects on the productivity of real estate firms' employees. The framework further suggests that the productivity of real estate enterprises' employees might be influenced by their awareness of digitalisation and the available and utilised DTs. The study provides a leeway to identify research gaps for researchers on DT and its impact on society and organisations.

Keywords: Sustainability, digitalisation, productivity, real estate firm.

Introduction

Competitive globalisation and a shift to a knowledge-based economy all over the world are aided by digitalisation. The use of Digital Technologies (DTs) and digitalisation dates back over the past 50 years and has grown significantly across various industrial sectors (Jewell *et al.*, 2022). Digitalisation is a crucial concept that integrates DTs into daily life and impacts how work is accomplished. According to Nasiri *et al.* (2020), DTs have been increasingly recognised globally as a megatrend that profoundly impacts society and people's daily lives.

Organisations and employees gain a great deal from the opportunities that come with digitalisation in the form of technological improvements and organisational innovations based on the technologies (Nasiri *et al.*, 2020). Alternatively, Elia *et al.* (2020) assert that the issue of digitalisation is digital disruption, which results from the Information and

Communication Technology (ICT) industry's explosive expansion.

Bellet *et al.* (2019) and Leito *et al.* (2019) also echoed earlier that the success of an organisation is largely dependent on the productivity of its people. Hence, productivity is essentially a key goal for organisations. Employee performance or success in terms of personal objectives is correlated with productivity. In reality, productivity, according to Kareem (2019) is a factor that directly impacts the business's revenue. An employee's output during a specific period can be used to measure productivity. An employee's production during a specific time can be used to measure productivity. Note that an employee's productivity will often be judged compared to the average output of employees performing similar tasks or measured in terms of how many units of a good or service an employee manages in a certain amount of time (Bellet *et al.*, 2019).

Productivity is determined by employees' understanding of knowledge and how they apply it to their daily tasks (Sarran-Mangal, 2022). In any event, the productivity of employees has been acknowledged in the literature as one of the most significant markers of a firm's performance. According to this viewpoint, productivity may rise due to the many technical setups that businesses use. Digitisation has come to be understood as a multifaceted phenomenon involving a wide range of different business strategies, from investing in new software or Information Technology (IT) products to redesign current processes (such as tying together products, processes, and services) and encourage organisational changes.

The real estate industry is one of the foremost lucrative and valuable sectors in the global economy and a considerable contributor to the Gross Domestic Product (GDP). Real estate assets are one of the market system's most complex and essential elements and have long been a valuable distributed resource that fulfils basic human needs for living space and security (Kalyuzhnova, 2018). It is also the foundation of many diverse types of businesses, national wealth, and a source of government revenue (Kalyuzhnova, 2018). In today's global stock market, real estate is recognised as the third-largest asset class after equities and bonds, very distinctive, complex, and unique (Spielman, 2016; Wouda & Opdenakker, 2019). For instance, Vigren *et al.* (2022) defined a real estate firm as an actor that owns, develops, and rents real estate as its primary business. On the other hand, Axford (2017) and Kalyuzhnova (2018) revealed that the entire value of assets in the global real estate industry had been expected to be USD217 trillion, with USD1.4 trillion in transactions in 2017.

Real estate firms have been embracing modern technologies to improve efficiency in their projects, which involve integrating systems approaches, project funds usage and service level agreement, and enhancement of information sharing on project performance. Musamali and Muchelule (2022) reported from Kenya that

77% of organisations Chief Information Officers (CIOs) have at least one type of cloud. However, 56% of them perceived the complexity of their IT infrastructure as the most significant barrier to usage. Real estate projects are facing plenty of challenges because of poor cloud computing practices, which have led to poor performance and a lack of capacity to implement internal control, resulting in poor quality.

Digitisation enables the corporation to be reorganised and implement significant changes across its functional areas (Gal *et al.*, 2019). Alternatively, Canhoto *et al.* (2021) stated that although firms do not incorporate digitalisation in a trajectory similar to the development of these technologies, they often accept the technologies most aligned with their goals and strategies. Much research has been done on digitalisation's effect on employees' productivity in businesses using a wide range of metrics and methodological techniques. Pioneering research has considered various variables, including investments in PCs, software, and hardware (Seclen-Luna *et al.*, 2022).

The majority of research, however, has focused on identifying the variables or barriers that influence the adoption of digitalisation, with particular emphasis on the importance of the firm's size, age, staff skills, level of technology use, and productivity. In any event, the productivity of employees has been acknowledged in the literature as one of the most significant markers of a firm's performance. According to this viewpoint, productivity may rise due to the many technical setups that businesses use.

Recent empirical research has revealed how digitalisation helps businesses become more productive. The adoption of digitisation was indeed acknowledged in the literature as being used to conduct e-marketing, e-commerce, and e-business to boost a company's productivity and sales. However, there is no consensus on the notion. It was discovered conveniently to analyse the most representative technologies that have a positive impact on a firm's net sales and productivity such as broadband and intranet,

digital training, digital consulting, websites, online selling, social networking, extranet, and enterprise information systems, in light of the prior background literature and given the abundance of digitisation that exists today (Turban *et al.*, 2021; Seclen-Luna *et al.*, 2022).

This study dwelled on a literature review on digitalisation and productivity in industries and organisations and how it affects real estate firms globally. A conceptual framework postulating that DT availability and usage directly affect employees' productivity in real estate firms and that digitalisation drivers and challenges moderate the effects of DT availability and usage on the real estate firms' employees' productivity was proposed. The write-up starts with an introduction and is closely followed by a review of the literature, as well as a discussion of the proposed conceptual framework in this section. The conclusion aspect brings the article to a close.

Technology Innovation and Firm's Productivity

Digital transformation necessitates financial investment and integration into the company's organisational structure. However, additional factors are likely to limit the effect of digitisation on employee productivity (Shen *et al.*, 2021). Several empirical studies have demonstrated how digitalisation boosts productivity in firms. Turban *et al.* (2021) and Seclen-Luna *et al.* (2022) stated that based on prior background literature and given the abundance of digitisation that exists today, it was deemed convenient to analyse the most representative technologies that have a positive impact on a firm's net sales and productivity such as broadband and intranet, digital training, digital consulting, websites, online selling, social networking, extranet, and enterprise information systems.

Much earlier, Rezaei *et al.* (2014) investigated the impact of IT on staff productivity with reference to Shiraz, Iran. Eight indices of human resources productivity were identified in the study, including motivation, creativity,

and innovation; the spirit of competition; activity cost reduction; the improvement of the quality of activities; work time reduction; job satisfaction; and human resources spirit. The study also considered the theoretical background of the literature and exploratory interviews with participants in the study area. The findings indicated a beneficial association between IT and productivity in human resources.

On the other hand, Appiahene *et al.* (2018) examined IT's influence on productivity through a thorough review and meta-analysis of the literature. 141 articles published between 1990 and 2017 were analysed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram. The findings showed that Europe had the highest percentage of contributions, 36.88% while Africa had a significantly smaller percentage, 8.51%, in the literature on IT and productivity. As a result, the study concluded that additional research on the subject should be conducted utilising African data.

Using First Bank of Nigeria Plc., Malaolu and Ogbuabor (2013) looked at how training and human resource development affect employees' productivity and organisational performance. The 75 participants in the research were selected using simple random sampling, and they completed standardised questionnaires. Descriptive statistics were used to examine the obtained data. The study's findings demonstrate that staff efficiency has significantly been increased via training, human resources development, and job productivity in the bank. Additionally, Gunu *et al.* (2013) investigated whether training and development for employees improve job productivity in the banking sector. Questionnaires were utilised to gather the primary data used in the study. Out of a total population of 35,386 people from the five banks utilised in the case study, the study used a sample of 395 respondents. The respondents were chosen randomly, and descriptive statistics and Pearson's moment correlation were employed to examine the data. Multiple regression analysis was used

to evaluate the concept. The study discovered that organisational commitment to training and development, frequency of training and development, and compensation for excellent performance greatly enhance organisational performance.

Cusolito *et al.* (2020) investigated how introducing DT affected factor demand and productivity using firm-level data from emerging nations. The study gives Revenue-based Total Factor Productivity (TFPR) premium estimates at the firm level for 82 emerging economies using data from 2003 to 2018 related to DT adoption. The study results showed that the use of DT and the other firm-choice factors (exporting status and managerial experience) impacted factor demand and productivity.

Key facets of DT and its effect on bank staff performance were examined by Chandrashekar (2021). The study's format was developed based on semi-structured interviews with employees of a few select banks over the phone, allowing for links between theoretical frameworks and practical results. According to the report, digitisation has greatly influenced how well employees do in the banking industry. It has transformed into a facilitator by providing a platform for employees to carry out their duties efficiently. Additionally, managers have been utilising techniques like cutting-edge support systems, prompt and clear communication channels, and various digital tools to improve employees' effectiveness at work as digitalisation advances. Digitisation generally benefits employee performance. Thus, managers must also be aware of potential drawbacks.

Siwale (2015) looked at the relationship between IT and employee performance: An example of the Tanzania Police Force's fingerprint unit. The survey included 23 respondents from the forensic unit and 20 respondents from IT, all of whom worked for the Tanzanian police force, for a total of 43 respondents. According to the study, employees are competent in using IT resources. Therefore, there is a connection between employee adoption

and performance, as well as employee creativity and IT adoption.

Alternatively, Agboola *et al.* (2019) examined the controversies, challenges, and repercussions of technology use and employee behaviour in the Nigerian business environment. The study's findings suggest that employee behaviour primarily influences how people use technology, encourages individual development, boosts productivity, and enhances organisational performance.

ICT's effects on Access Bank Plc employees' work-life balance were studied by scholars in 2021. Consequently, data was gathered from primary and secondary sources, processed with Statistical Package for the Social Sciences (SPSS), and the chi-square test was used to assess the hypotheses. The hypothesis test results showed that ICT improved the work-life balance of Access Bank Abuja. The study also showed that greater work-life balance has increased employee autonomy at Access Bank. Additionally, research showed that Access Bank staff are satisfied with their jobs because of ICT.

Gozi and Felicia (2019) conducted a study at the Oko Branch of the Union Bank of Nigeria PLC to examine how technological change affects staff performance. The Chi-Squared statistical tool was used for data analysis. The results showed that technological change is embraced by bank management, has helped the organisation under study's social infrastructure expand, and has enhanced the bank's information systems, increasing their efficiency.

The impact of digital banking technology on bank productivity and hiring needs in the Indonesian banking sector was studied by Rivai (2021). The sample for this study is made up of 29 banks that were specifically chosen based on how aggressively they employ digital banking technology, which is presumed to be linked to foreign shareholdings. The study discovered that although personnel demand and recruitment tend to decline as digitalisation increases, efficiency does. Additionally, it has been discovered that a greater percentage of

foreign ownership has a considerable impact on how much technology has been adopted by the purchased local banks. The empirical studies reviewed above demonstrated how technology in companies and enterprises greatly affects employee and organisational performance and productivity. However, none of the empirical studies examined has referenced the impacts and challenges of technology on real estate enterprises and employees' productivity. Hence, the basis for the proposed study.

Real Estate Firms in the Context of Using Digitalisation

The study of digital phenomena long ago moved past understanding the Internet as an e-elsewhere, instead emphasising how DTs are part of a web of social, cultural, and economic ties that criss-crosses and outnumbers the Internet (Fields & Rogers, 2021). This involves using an integrated systems approach to systems and processes that mitigate costs and enhance information sharing, leading to improved performance (Musamali & Muchelule, 2022). Firms invest in DT to improve their economic performance by advancing information dissemination, decision-making, organisational capacities, organisational excellence, receptiveness, and delivery. IT has played a crucial role in advancing accounting information systems. Indeed, it enabled greater information exchange and much more complex computing tasks, launching a comprehensive approach for various advancement contributions.

Alternatively, Njoroge and Opuodho (2022) determined that the real estate industry has endured largely underdeveloped even though industry actors recognise the economic and social significance of the sector. Vigren *et al.* (2022) concluded that there is a need for research that explicitly takes real estate owners' processes and real estate firms related to innovation and digitalisation as a subject of empirical study. Previous research has given little attention to the importance of the wider ecosystem.

The real estate firm needs to have dynamic capabilities to meet the changing supply of

services, assimilate new technologies into the organisation, and apply technologies to commercial ends, meaning that they need the capacity to absorb the changes (Vigren *et al.*, 2022). The real estate firm's dynamic capabilities and absorptive capacity are internal organisational factors. These internal factors are linked to the wider ecosystem through the real estate firm's business relationships with other firms and organisations, meaning that the internal organisational dynamic capabilities and absorptive capacity are interdependent with the surrounding ecosystem. Hence, lessons learned in different real estate projects could be managed with the help of mobile computing-based knowledge platforms. This helps real estate firms to manage records more conveniently, reduce search times, and increase privacy and transparency.

Real Estate Firms' Innovation and Capacity in the Context of Digitalisation

According to a study on innovation, possibilities are transformed into novel ideas and then put to practical use (Frishammar *et al.*, 2019; Verganti *et al.*, 2020). Organisations may also manage innovation processes. The main components of managing innovations are routines and processes designed to foster innovation in businesses. These routines and processes are ingrained in the company as continuing operations that are interconnected and dependent on workflows. The daily routines and procedures of the organisation, taken as a whole, make up its capabilities. These capabilities might be more or less dynamic, showing the company's capacity for learning.

Additionally, dynamic capacities affect an organisation's capability for absorption, or the capacity to gather and analyse fresh data to create novel goods and services (Miroshnychenko *et al.*, 2021). This is crucial when new technologies and actors alter the operational environment. Therefore, dynamic capacities and absorptive ability are two important intra-organisational aspects of innovation management. Currently,

businesses' innovation routines and processes are inter-organisational since they rely on several partners and networks for their innovation operations (Mokhtarzadeh *et al.*, 2020).

These routines and procedures unite to establish innovation ecosystems, which are characterised as intricate workflows that support shared system-level innovation objectives. Traditional industries frequently have low levels of internal absorptive capacity, making it especially important for companies to collaborate and engage in complementary knowledge-related search, transformation, and storage activities. In these situations, various organisations act as innovation intermediates who serve the crucial purpose of organising collective absorptive capacity at a sectoral level (Otair *et al.*, 2022).

Benefits of Technology on Employee Productivity

The technology significantly boosts employee productivity, mainly when investing in businesses' assets and personnel (Adegboye & Iweriebor, 2018). The use of technology also offers greater operational efficiency, cost savings, and increased workplace competitiveness, according to some studies. Employees, for instance, may readily share their knowledge, skills, and expertise with co-employees to enhance their capacity to use technology to solve challenges (Rao *et al.*, 2021). DT is typically employed in the workplace to provide the groundwork for an inspirational work environment that positively affects employees' incentives and shares the firm's preferences (Aldrin & Merdiaty, 2019).

Skype, another digital tool, allows for greater face-to-face interactions during telephone-like talks. Technology and the Internet have also facilitated flexible working, giving family members the freedom to work hours (Anderson & Kelliher, 2020). Given that working women can handle business remotely and spend more time with their families, they indicated that utilising the Internet helps them manage work and life. In other instances, relating to a business

method, e-commerce has impacted the enhanced completion of commercial transactions and sped up connections between suppliers and customers. Given those mentioned above, adopting digital devices can increase productivity and efficiency and allow people to work in the office and at home by utilising digital gadgets, several studies have confirmed similar findings. However, other research highlights ICT's beneficial and harmful consequences (Pordelan *et al.*, 2022; Gaglio *et al.*, 2022).

Effects of Technology on Employee Productivity

Unfortunately, employing DT tools like mobile phones, computers, and other communication tools may encourage a link between work and employees outside regular business hours (Wedlake *et al.*, 2021). In other words, cutting-edge technology like ICT has been utilised to pressure employees to be more productive and stay connected to the workplace at all times, affecting their behaviour and psychological responses. The distinction between work and personal time blurs due to increasing job demands and hours as well as stress and difficulty levels. Digitalisation facilitates the introduction of flexible work policies through telecommuting. Nevertheless, if employees cannot leave their home office, it may exacerbate family-to-work conflict. As a result, this prolonged work zone can stress out employees and their families by decreasing time spent with family to constant work-related difficulties (Wedlake *et al.*, 2021).

As a result, employees are impacted by changes in working environments brought on by DT, which leads to unforeseen issues with both psychological and physical health (Blagoev *et al.*, 2018; Malik *et al.*, 2021). Murashkin and Tyrväinen (2020), claims this condition is "The sickness of modern people caused by not being able to adjust to new technology intelligently". For instance, when using a computer or a mobile device, people may lose track of time or feel constantly tied to their place of employment. In conclusion, DT has altered how productions are run and how their personnel do their everyday

business. However, it has not had solely beneficial effects.

Conceptual Framework of the Study

A conceptual framework is a collection of ideas and/or reproductions assembled as a study plan demonstrating the relationships between research factors (Mugenda & Mugenda, 2009). The relationship between the independent variables and the dependent variable is made clearer by the conceptual framework. The following are some of the conceptual frameworks that are pertinent to this study:

A conceptual framework (Figure 1) on technology usage and employee behaviour debates, problems, and repercussions in the Nigerian corporate environment was established by Agboola *et al.* (2019). The concept demonstrates that although employee behaviour is how employees respond to specific working events, technology utilisation is about uptake and continuation (Agboola *et al.*, 2019). Figure 1 illustrates the conceptual underpinning.

According to the conceptual framework in Figure 1, when a new technology is used for a task or activity, it impacts how well employees perform if they adopt the technology (employee behaviour). This could increase organisational productivity and justify management investment in the technology. On the other hand, employee behaviour might fail to meet management expectations if an employee rejects new

technology. Due to the modifications that will be made to their job description that might lead to redundancy or retrenchment, employees will perceive job insecurity as a result of adopting new technologies (Soja & Soja, 2020).

Another conceptual framework on the moderating impact of technology awareness on the link between Unified Theory of Acceptance and Use of Technology (UTAUT) characteristics and behavioural intention to utilise technology was determined by Abubakar and Ahmad (2013). The connection between performance expectations, effort expectations, social influence, enabling conditions, and behavioural intention to utilise POS is moderated by technological awareness in Figure 2.

The conceptual framework in Abubakar and Ahmad (2013) showed how the link between the UTAUT components (performance expectation, effort expectancy, social influence, and enabling conditions) and behavioural intention to use Point of Sale (POS) in the Nigerian retail business is moderated by technological awareness. Note that POS is the hardware and software that enable a business to make sales. This method records the revenue at the point of sale because cash is received on-site or it is reasonably certain that cash will be received soon and is thus a finalised transaction. Al-Dabbagh (2015) also created a conceptual framework for the impact of ICT connectivity on individual job productivity. The study's conceptual framework is illustrated in Figure 3.

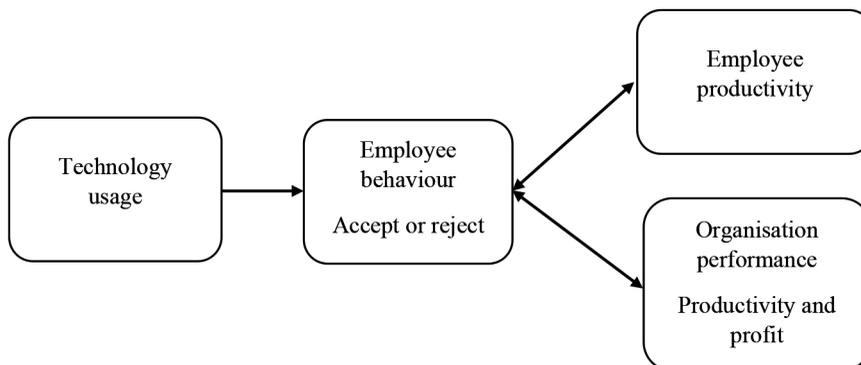


Figure 1: Technology usage and employee behaviour (Agboola *et al.*, 2019)

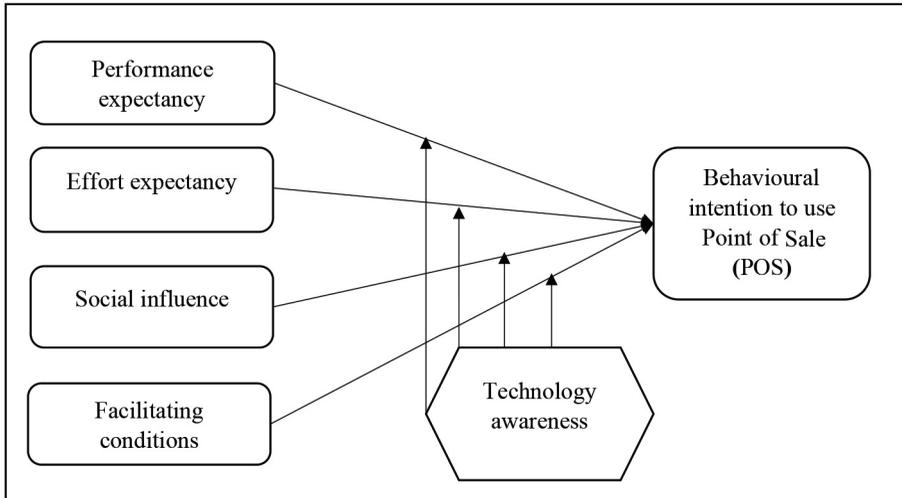


Figure 2: The moderating effect of technology awareness between UTAUT constructs and behavioural intention to use technology
 Source: Abubakar and Ahmad (2013)

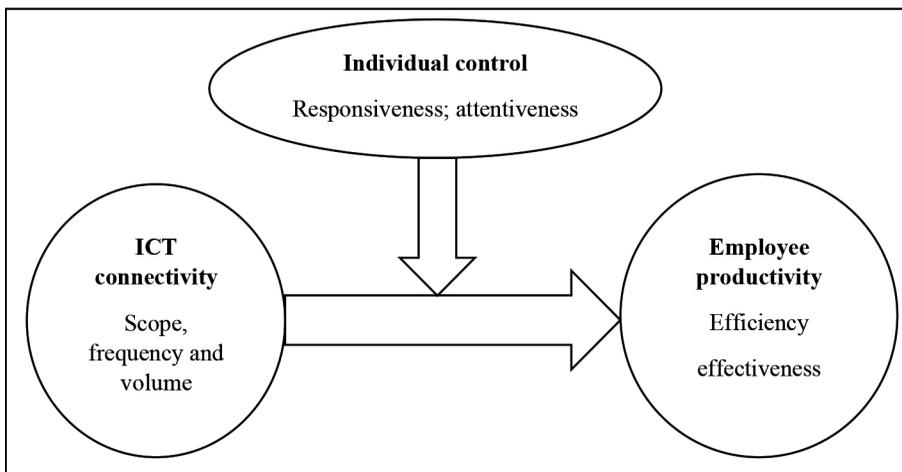


Figure 3: ICT connectivity on individual work productivity (Al-Dabbagh, 2015)

Three constructs made up the conceptual framework: Employee productivity, ICT connectedness, and individual control. The framework suggested that employee productivity was impacted by ICT connection. Other than that, the candidate correlations indicated that employee productivity and ICT connectivity might be influenced by individual control. A case study of the fingerprint UNITAT Tanzania Police Force was presented by Siwale

(2015) as a conceptual framework for IT and staff performance.

In summary, the DTs available and used by Agboola *et al.* (2019) are independent variables influencing employee behaviour and productivity. In an alternative presentation by Al-Dabbagh (2015), the technology construct called ICT connectivity influences employee productivity, efficiency, and effectiveness. Such relationships were suggested by Agboola *et al.*

(2019) to be mediated by challenges such as employee behaviour and acceptance/rejection. The relationship between technological constructs and employee productivity was reported to be moderated by individual control in Al-Dabbagh (2015) and technology awareness (Abubakar & Ahmad, 2013) through digitalisation awareness.

The conceptual framework for this study was supported by the study construct of previous researchers on the digitalisation concept (Lin *et al.*, 2020; Polly *et al.*, 2021), digitalisation challenges and drivers (Vartolomei & Avasilcai, 2019; Akpan *et al.*, 2022; Van Veldhoven & Vanthienen, 2022), awareness (Abubakar & Ahmad, 2013), and employee productivity (Al-Dabbagh, 2015; Agboola *et al.*, 2019) as presented above.

These theories and the conceptualised arguments were used to develop the conceptual framework for this study (Figure 4). The framework in Figure 4 suggests that DTs available and used are technology constructs that influence employees’ productivity, with mediation effects of digitalisation challenges and digitalisation drivers and moderation impact of digitalisation awareness.

The proposed conceptual framework of the study hypothesised that the availability of DTs and the use of digitalisation directly

affect employees’ productivity. In contrast, digitalisation challenges and digitalisation drivers moderate the effects of DT availability and usage on real estate firms’ employees’ productivity. Meanwhile, awareness moderates between the DTs available and those used to improve the real estate firms’ employees’ productivity in the study area.

Implication of the Proposed Study Framework

According to the proposed framework, DT availability and usage impact employee productivity in real estate organisations, which is then moderated by awareness. However, DT drivers and challenges mediate the effects of the availability and usage on real estate firms’ employees’ productivity. Thus, the framework suggests that strong adoption drivers for DT may be able to overcome adoption barriers, create more awareness, provide training programs, and boost employee productivity. Given the aforementioned information, policymakers and industry stakeholders can collaborate to develop policies that support training initiatives, investments in digital infrastructure, and the successful integration of technology into the real estate industry. To increase employee productivity, real estate companies and other relevant stakeholders can use this knowledge to create strategies. This encourages DT adoption

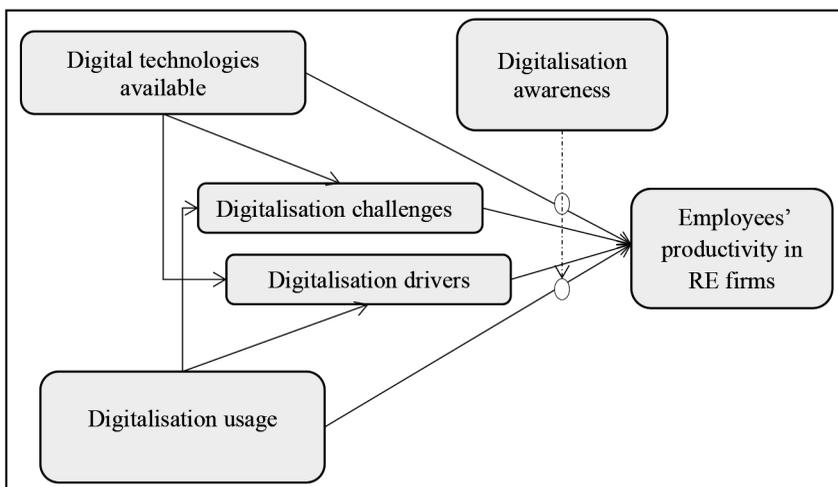


Figure 4: A proposed conceptual framework of the study

and closes the awareness and usage gap of those with lower mean values.

Conclusions

An overview of the study of digitalisation shows that the use of DTs as electronic tools for business activities and digitalisation has increased significantly over the past 50 years across various industrial sectors. It has since been recognised globally as a megatrend that significantly impacts society and people's daily lives. According to studies, businesses and employees benefited greatly from the advantages of digitalisation through technology advancements and organisational innovations based on the technologies. However, despite technological advancements, particularly in the developed world, the acceptance of real estate specialists and firms has been observed to be rather slow in most developing nations.

However, the emergence of these technologies in the real estate sector is also thought to be gradually improving the fortunes of the real estate practice globally, leading to the growth and profitability of real estate firms and an improvement in the productivity and performance of their employees. Adopting these technologies and digitising the real estate sector in its entirety will significantly improve real estate firms' employee performance and the real estate sector as a whole and also give employees the tools they need to perform their jobs effectively. Therefore, we can conclude that there is a connection between employee productivity and awareness, access to, and use of DT.

In light of this context, this study has developed a conceptual framework to test the hypothesis of the use of DTs and the availability of those tools. These directly impact employees' productivity and the effects of the availability and use of DT on the productivity of real estate enterprise employees are moderated by the drivers and challenges of digitalisation. The conceptual framework further suggests that the productivity of real estate business personnel

is moderated by awareness of the impact of the DTs that are employed and available.

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Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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