Full paper

International Journal of Real Estate Studies

INTREST

# Awareness and Usage of Mobile Technology in Real Estate Practice in Developing Countries: The Case of Ikeja, Lagos State, Nigeria

Modinat Adepeju Akeju[1], Daramola Thompson Olapade[2]*, Theophilus Olugbenga Babatunde[2]

[1]*Department of Estate Management, University of Lagos, Akoka, Lagos, Nigeria*
[2]*Department of Estate Management, Obafemi Awolowo University, Ile-Ife, Nigeria*

*Corresponding author's email: darrypad@gmail.com

**Article history**: Received: *25 October 2020* Received in revised form: *19 February 2021*
Accepted: *21 April 2021* Published online: *23 June 2021*

**Abstract**

Mobile technology offers the opportunity for accurate, timely and quality service delivery; however, its adoption in real estate is limited. This study assessed the awareness and utilisation of mobile technology among real estate firms in Ikeja Area of Lagos State, Nigeria. This is with a view to provide information that is capable of increasing the awareness level and promoting the usage of mobile technology in real estate practice. Questionnaire were administered on 78 estate surveying and valuation (ESV) firms in the study area. Data collected were analysed using descriptive statistics. The result indicated that the level of awareness of ESV firms to mobile technology in real estate was somewhat high (mean=3.77 on a scale of 5) but its adoption was limited to few mobile applications such as social media apps, email, Google Earth and Google Map while others such as Sitegeist, Vert and Argus Valuation have not gained popularity among the ESV firms. The low level of adoption of mobile technology might negatively impact the service delivery of real estate firms in the future where such technology will become indispensable.

*Keywords*: Remote working, technology in real estate, mobile phone, mobile technology, valuation



## 1.0 INTRODUCTION

With over 3.0 billion smartphone users across the world (Technostacks, 2019), the use of mobile technology (MT) is gaining popularity in all industries including the real estate. Mobile technology has enabled an expansion in technology platforms to be applied to nearly all areas of lives (Baum et al., 2020). This is because mobile technology offers better mobility, it is location-centric, and offers access to instant notifications. This has allowed the development of many mobile apps targeted at improving customer access, serve as a direct marketing channel, handles paperwork, and solving specific industry problems (Technostacks, 2019). Mobile technology refers to arrays of applications or software programs which are developed for use in mobile devices to offer instantaneous access to specific services.

These innovations in technology with diversity of roles in various aspects of life make it indispensable for real estate professionals who are desirous of efficient service delivery to clients. It is also perceived to be a readymade solution to some real estate problems such as record keeping, data management, retrieval and updating of records, dispatching letters, meeting with tenants, and so on. Mobile technology offers the benefit of a more flexible work environment for real estate professionals. It has opened up the real estate practice to a new experience in data gathering, information dissemination, property search and listing, cash flow forecast, virtual inspection and so on at the convenience of our home/office (Cradduck, 2013; Oyetunji et al., 2018).

Real estate practice being a multifaceted discipline which requires vast knowledge and proficiency in gathering, using and disseminating information benefits immensely from using mobile technology. For instance, valuation which involves various activities such as property inspection, market survey and analysis, computation and presentation of data and report writing can be made easy and accurate with the use of mobile technologies. In a similar vein, mobile technology can also increase efficiency in property management in such a way that reduces the running cost on the property to the barest minimum; through the use of mobile technologies in sending letters, collecting rent, attending to complaints, keeping records, rent remittance among others. Again, it also offers unending benefits in some aspects of estate agency through property search and listing; document sharing/transfer; conducting inspection with different clients at the same time, signing documents and so on. Real estate profession now has at its fingertips a variety of proprietary software packages for use in valuation, agency and property management. Parker and Robinson (2002) stated that those packages can enable more accurate analysis of data and more comprehensive information to be provided in a more timely and cost-effective manner.

In Nigeria and many developing countries, the use of mobile technology is also increasing by the day. For instance, the number of smartphone users in Nigeria with a population of 200 million people in the year 2020 was estimated at between 25 and 40 million users

(O'Dea, 2020). This has allowed many sectors in the country such as the financial sector to make good use of mobile technology in rendering services to their customers. This cannot however be said of the real estate sector in Nigeria and many developing countries which are still lagging in the use of mobile technology for their service delivery. For an instant, apart from a handful of real estate listing applications currently in use in the country such as Jiji.com, ToLet.com, PropertyPro.ng, KoboRent, the real estate industry still lags behind in the full adoption of mobile technology for its services (Aihie, 2019; Kakulu, 2003; Olufunso, 2020).

Considering the importance of mobile technology; its awareness and usage in real estate practice in developing countries such as Nigeria is not known. Meanwhile, the Nigeria real estate sector is a major contributor to the GDP of the country. In the last decades, the value-added of the sector to the GDP grew from 3.5% to 13.4% which indicates an annual growth rate of 11.2% (Elile et al., 2019). In the year 2020, data from the Nigerian Bureau of Statistics (NBS) indicate that the real estate sector contributed about 7.5% to the GDP despite the global economic situation. Considering the foregoing, the overarching questions this study addresses is "what is the level of awareness and utilisation of mobile technologies in real estate practice"? In this regard, the paper is divided into five sections including the introduction. The second section explores the concept of mobile technology and its advantage while the third section is a review of past studies. The fourth section deals with the research method for the study while the fifth section presents the findings. The last section concludes.

## ■2.0 LITERATURE REVIEW

### 2.1 Concept of Mobile Technology and Its Advantages

Mobile technology as earlier stated refers to devices that are both transportable and offer instantaneous access to information. The technology includes; all mobile applications, software etc. such as GIS, GPS, Waze, Google map, Google earth, Argus Valuation, Cam Scanner, Dropbox and so on that can easily be used with mobile phones or PCs when in need without going to the office. Mobile devices associated with mobile technology refer to all the technologies that enable voice and data services via cellular connectivity, including second-generation (2G), third-generation (3G), fourth-generation (4G) and now the fifth generation (5G) It encompasses internet-enabled transportable two-way communications devices such as personal digital assistants, smartphone, watches, computing devices and the networking technology that connects them (Cistematix, 2011).

Over the year, mobile technology has improved from a simple device used for a phone call and messaging in the past into a multi-tasking device used for GPS navigation, internet browsing, gaming, an instant messaging tool, virtual/digital inspection etc. The mobility which mobile technology offers is about getting work done anywhere, with a variety of tools that all work together to aid in collecting and managing information. For example, applications (apps) like Dropbox are a great way to save MLS sheets as a PDF and have access to them instantly from a mobile device; document scanner apps allow you to avoid making hard copies of deeds and contracts; remote desktops apps allow you to access your office computer from your tablet (Reding et al., 2014). With the use of mobile technology, it is now easy to catch up with every form of entertainment from the comfort of your home. It has also made it possible for one to easily locate places on the globe using the global positioning system (GPS). Especially in the business world, the importance of mobile technology cannot be overemphasized; bankers increasingly rely on mobile technology for managing finances and stocks. Many business firms use mobile technology to increase their earnings by making it easier for customers to patronize their product with the use of some apps. The evolvement of mobile technology has indeed made our life easier and also saves us time and resources (Macwan, 2017).

The importance of mobile technology for use in service delivery is as a result of their multiple input approaches, such as pictures taking, sound recording, video recording, pictures drawing and text keying, virtual meeting and ability to accommodate different applications (Lai et al., 2009; Pimentel, 1999). Tagliaro et al. (2021) summarised the impact of technology (such as mobile technology) in real estate to include automation, digitisation, brokerage and management of real estate.

Marketers now can sell their products with ease through mobile technology. Real estate professionals can also use property websites to advertise properties for sales and letting as well as to conduct virtual inspections and carry out a valuation with the help of mobile technology such as Google Apps, Virtual Inspection Apps, Social Media Apps, Argus Software, Software as a Service, Platform as a Service and other mobile applications and software. It has also made file transfer, signing, and so on possible for users through electronic means. The mobile phone is also equipped with internet connectivity, making it easier for the user to gain information and also to download files from the internet at a go. Video call conferencing is another achievement that has come to reality through mobile technology as well as virtual meetings. Professionals and clients now have the channel to communicate even without seeing in person (Macwan, 2017).

Real estate services today can be delivered with ease using various technology/digital tools which support the multiple activities of the real estate professionals, including but not limited to:

- Specialised real estate tools (e.g. Argus software, DIY landlord, Eva property.com etc)
- Cloud storage tools (e.g. Dropbox, Onedrive, Google drive etc)
- Digital documentation and validation with scanning tools (e.g. Pdf Escape, Dotloop, Notepad, Scanner etc)
- Mapping and Geo-referencing tools (e.g. Google map, GIS, GPS, Google Earth, Sitegeist etc)
- Social medial and other digital communication tools (e.g. Whatsapp, Facebook etc)
- Measurement conversion and calculation tools (e.g. Vert, Mortgage Calculator etc)
- Instant messaging and document exchange tools (e.g. Yahoo mail, Gmail etc)

### 2.2 Review of Past Studies

The use of technology in real estate has been a subject of intense academic research around the world, especially in developed countries. Available studies have shown that efforts were concentrated on many aspects of this issue. These included the relevance and application of ICT in estate surveying and valuation (Chiedu, 2010; Ibisola et al., 2015); factors influencing the use of ICT (Adeyemo et al., 2015;); impact of information technology on real estate income (Jud et al., 2002); application of GIS in estate management (Olaniyi et al., 2006); technology /digital disruption in real estate industry (Deloitte, 2015; Lizam, 2019; Reding et al., 2014) and PropTech evolution (Aihie, 2019; Baum, 2017; Baum et al., 2020; Olufunso, 2019; Siniak et al., 2020; Tagliaro et al., 2021). However, studies on awareness and usage of mobile technology have been limited. Similar past studies in this regard include Poynter (2015); Olukolajo et al. (2015); Oyetunji et al. (2018); Babatunde et al. (2016); Ibisola et al. (2018); Warburton (2016); Nwanekezie and Okeahialam (2019) and Halvitigala and Gordon (2014). Apart from the fact that the findings of these studies focus generally on ICT, GIS, PropTech, and social media, none of these studies delve into the level of awareness and usage of mobile technology.

It is thus pertinent to look into the findings of the various studies as they relate to this study. For instance, Chiedu (2010) and Ibisola et al. (2015) examined the tools and software that can be used in estate surveying and valuation like the computer, e-mail, fibre optics, teleconferencing, GIS and so on. They ascertained that most professionals are not aware of the existing computer packages and concluded that ICT tools that are specific to real estate surveying and valuation are lagging. Some other studies such as Olaniyi et al. (2006) focused on the use of specific applications such as GIS in real estate. Adeyemo et al. (2015) examined the factors that influence the use of ICT by real estate professionals in Minna, Nigeria. There have been little efforts on the awareness and usage of mobile technology in real estate practice since previous studies either focused on factors that influence/prevent the use of ICT or examined the impact of ICT on the profession and thus created gap to be filled by this study.

Some earlier studies with a focus on mobile technology were mostly on the use of social media apps. For instance, Olukolajo et al. (2015) explored the assessment of the use of social media in real estate transaction focusing on Lagos property market. discovered that the widely used social media platforms for real estate were Facebook, YouTube and Twitter. Similarly, Babatunde et al. (2016) discovered that ICT being used for real estate agency in Nigeria in the order of usage includes email, phone call, Facebook, website and bulk SMS. Others which were the least used ICT media include YouTube, Weblog and LinkedIn. The study of Ibisola et al. (2018) in Abeokuta, Nigeria also revealed that estate surveyors and valuers made good use of social media in marketing their products. This is also similar to the result of Nwanekezie & Okeahialam (2019) in Uyo, Nigeria. While the studies confirmed the use of social media as a relevant tool in real estate agency, they are however limited to examination of a form of mobile apps and an aspect of real estate practice – agency.

Beyond the use of social media tools, some studies considered the use of some ICT tools in real estate. Oyetunji et al. (2018) discovered that real estate professionals in Nigeria are only familiar with general-purpose tools like email, Microsoft Office, Excel while only a few of the practitioners are familiar with specialized real estate designed software like ARGUS, Yardi, IBM, etc. In a similar vein, Olapade and Ekemode (2018) examined the awareness and utilisation of Building Information Modelling (BIM) for facility management (FM) among FM companies in Lagos, Nigeria. The study discovered a low level of awareness and adoption of BIM for FM in the study area. Again, Halvitigala and Gordon (2014), in their survey conducted in New Zealand on the use of computer software in residential property management sector discovered that all property management companies surveyed were using property management software to facilitate property management tasks but not used in full capacity. The study focused on property management which is just an aspect of real estate management and was also conducted in a developed country as against the developing country focus by this research. This created a major gap to be filled by this work. Apart from the fact these previous studies focus generally on ICT or specific ICT application, there has been little effort on the awareness and usage of mobile technology in real estate practice which is the focus of this study.

The study of Poynter (2015) which appears to be among the few studies that have examined the utilization of mobile technology in real estate focused on the utilization of mobile technology in commercial market research. The study discovered that mobile technology can be used by researchers either actively or passively. The areas of utilisation of mobile technologies in market research reported in the study include taking part in online surveys via web browsers on mobile devices; taking part in telephone surveys from mobile phones; mobile devices being used by interviewers; taking part in the collection of diary and ethnographic data using mobile devices and finally the collection of passive data such as device usage and location. The study is however limited to the usage of mobile technology for real estate research and other aspects of real estate practice such as agency, valuation and property management were not examined.

In another study by Warburton (2016) on the role of technology in the real estate industry in three different countries of US, UK and SA, the author discovered that US and UK had employed and embraced mobile technology to a greater extent than SA. It thus appears that there is a dearth of literature on the awareness and utilisation of mobile technology in real estate especially from the perspective of an emerging African economy, despite the apparent benefits confers on real estate practice. This, therefore, calls for more empirical studies to investigate this new normal that could enhance real estate practices in the country.

## ■3.0 METHODOLOGY

The research design employed for this study is the survey research type through the use of self-administered questionnaire. The study population relevant to this study are Estate Surveying and Valuation (ESV) firms. The ESV firms in Nigeria render services such as agency, valuation/appraisal, property management and general real estate advisory services (Olapade et al., 2018). The study population was limited to Ikeja area of Lagos State which is one of three major stratifications of the Lagos property market. The numbers of registered Estate Surveying and Valuation firms located in Ikeja were 78 according to 2016 online Nigerian Institution of Estate Surveyors and Valuers' (NIESV) directory of registered firms. The study adopts the total enumeration of the population of 78 for this study. This is in line with the assertion of Watson's (2001) which suggested the use of a sample of 50 per cent of the population for a population above 100 and total enumeration for a population below 100. Out of the 78 questionnaires administered, a total of 57 questionnaires were retrieved from

the ESV firms. However, only 50 of them were found useful while the remaining 7 were not useful due to one error or the other. This thus represents a total survey response rate of 64.1% from estate surveying firms in the study area. The close-ended questionnaire employed for data collection was structured into 3 sections which include the personal profile of respondents and their firm, the second section contained information on the level of awareness of respondent of mobile technology while the third section is on the utilisation of mobile technology in real estate. The first contained questions on the socioeconomic characteristics of the practitioners and firms operating in the study area. To analyse these socioeconomic characteristics, information such as academic and professional qualifications and post-graduation experience of respondents was obtained through the survey. Similarly, information on the profile of the firm such as the size of the firm and year of establishment were also obtained.

The second section of the instrument focused on the level the awareness of respondent to some selected mobile technology. In order to select the mobile applications, use in real estate practise, a list of mobile applications categorized as "Productivity and Utility apps" in Google Play Store and Apple App Store were stratified into seven groups. The group included instant messaging and document tool; specialized real estate tools; cloud storage tools; digital documentation and validation with scanning tools; Geo-referencing tools; social medial and other digital communication tools; and, measurement conversion and calculation tools. To prune down the list of the array of mobile applications under each group; a pilot survey was carried out before this study. In the pilot survey, some practitioners were asked to list particular mobile application do they use for each of the categorized tools. The result of the pilot survey revealed that common application among the practitioners includes Computerized Database, DIY landlord, Dotloop, Dropbox, Electronic Mailing System, Eva Property.com, Evernote, Google Earth and Google Map, GPS, Mortgage Calculator, PDF Escape, Vert, Property Management Software, Sitegeist and Social Media application. The list of the selected mobile applications was presented to the respondents to assess their level of awareness of the mobile application for usage in real estate practice. The ranking was through a five-point Likert scale of "Extremely aware", "Moderately aware", "Somewhat aware", "Slightly aware" and "Not at all aware" with score 5, 4, 3, 2, 1 respectively. The mean of the level of awareness for each mobile technology was also calculated. This approach was found useful in earlier studies on real estate such as Halvitigala and Gordon (2014), Olapade and Ekemode (2018).

The last section of the instrument was on the assessment of the level of utilisation of some selected mobile technology in three areas of real estate practice namely valuation, agency and property management. The list of Mobile Technology in the second section of the instrument was also presented to the respondents for ranking based on Likert scales which assigned "5" to "Often used", "4" to "Sometimes used", "3" to "Used", "2" to "Rarely used", and "1" to "Never used". The mean was also calculated and Bar Chart of the mean was also constructed.

## ■4.0 RESULTS AND DISCUSSION OF FINDINGS

This section presents a comprehensive analysis of data collected and the discussion of the findings. The discussion is presented under three subheadings. The first considered the background information of the respondent and the respondents' firm while the second part presents the findings on the awareness and utilisation of mobile technology.

### 4.1 Background Information of Respondents

Table 1 presents the background information of the respondents. The responses in Table 1 disclose that there were more males (74%) among the respondents than females (26%). This shows that there were more male than female among the practitioners in the study area. The reason for this might be as a result of the notion that the strenuous nature of the profession is more suitable for the male gender. The table also shows that majority of the respondents (23, 46%) had between 6-10 years of professional experience while 16 (32%) of the respondent had 1-5 years and 7 (14%) had between 11 to 15 years of experience. Also, those with more than 15years of experience were 4(8%). This shows that 34 (68%) of the respondents possessed more than 5years' experience. On academic qualifications of responding practitioners, the results show that the prominent level of academic qualification among the estate surveyors was Higher National Diploma (HND) (50.0%) and Bachelor of Science (B.Sc) (30%), all in Estate Management while few (20%) had Masters. This has clearly shown that Estate Surveyors in the study area have not given priority to the acquisition of higher degrees. This result is similar to the findings in Olapade et al. (2018) where about 75% of the respondent is same market had first degree as their highest level of education. The reason for this could be that appropriate higher degree are scarcely available in the study area or perhaps the respondents lack information on the benefits of undertaking post graduate degrees. Also, most of the respondents (33; 66.0%) were Associate members of Nigerian Institution of Estate Surveyors and Valuers ANIVS while only few (3; 6.0%) have attained the fellowship cadre. The associate members refer to graduates of Estate Surveying and valuation who have undergone the mandatory pupillage and have successfully passed the test of professional competence while the fellows (FNIVS) are those that have attained the peak of their professional membership after having being an associate for not less than 10 years (Olapade et al., 2018).

**Table 1** Background information of respondents

| Characteristics/Statistics | Subheadings | Frequency | Percentage |
|---|---|---|---|
| Sex | Male | 37 | 74.0 |
| | Female | 13 | 26.0 |
| Years of Professional Experience | 1-5 yrs | 16 | 32.0 |
| | 6-10 yrs | 23 | 46.0 |
| | 11-15 yrs | 7 | 14.0 |
| | Above 15 yrs | 4 | 8.0 |
| Highest Academic Qualification | HND | 25 | 50.0 |
| | B.Sc. | 15 | 30.0 |
| | M.Sc. | 10 | 20.0 |
| | FNIVS | 3 | 6.0 |
| Highest Professional Qualification | ANIVS | 33 | 66.0 |
| | Probationer | 14 | 28.0 |

The information on the level of professional and academic qualifications and post-qualification experience of the respondents validates the data collected from this study to be reliable. This is because the respondents were expected to be able to provide reliable information given their level of experience, academic and professional background.

### 4.2 Profile of Respondent's Firm

This provides information on the respondents' firms such as the number of branches, the year of establishment and the staff strength of the firms to help in establishing the level of experience of the firms.

**Table 2** Estate surveying and valuation firm's profile

| Characteristics/Statistics | Subheadings | Frequency | Percentage |
|---|---|---|---|
| Number of branches | 1 | 31 | 62.0 |
| | 2 | 6 | 12.0 |
| | 3 | 6 | 12.0 |
| | 4 | 3 | 6.0 |
| | Above 4 | 4 | 8.0 |
| Year of Establishment | 1-5 yrs | 5 | 10.0 |
| | 6-10 yrs | 19 | 38.0 |
| | 11-15 yrs | 16 | 32.0 |
| | 16-20 yrs | 6 | 12.0 |
| | Others | 4 | 8.0 |
| Staff Strengths | Less than 10 | 33 | 66.0 |
| | 10-40 | 14 | 28.0 |
| | Above 40 | 3 | 6.0 |

Table 2 shows 62% of the surveying firm in the study area have one branch while those that have 2 and 3 branches are 12% each and 14% of the ESV firms surveyed. Also, 3(6.0%) and 4(8.0%) of the firms had 4 and more than 4 staff strength respectively. This result indicates that most of the firms are small-sized firms. On years of establishment, 38% of the respondents established over 6 years ago. While 32% have been in operation for over 11 years and 12% have been in existence for over 16 years while only 10% are new in the industry with less than five years' experience. The results also showed that 66% of the firms have less than 10 staff and 28% have between 10 and 40 staff while only 6% have staff strength of more than 40.

### 4.3 Level of Awareness and Utilisation of Mobile Technologies (MT) for Use in Real Estate in the Study Area

Table 3 presents the mean scores for the level of awareness of each of the Mobile technology. Similarly, the Table presents the mean score for the level of utilisation of mobile technology for valuation, property management and agency. From the said table, the MT with the level of awareness with a mean score above 4.0 includes electronic mailing system (4.94), social media (4.68), GIS & GPS (4.68), Google Earth & Google Map (4.60), Cam Scanner (4.26), Computerized Database (4.18) and Property Management Software (4.14). Again, mobile technology with a low mean score on the level of awareness includes Vert (2.52), Sitegeist (2.58) and Argus Valuation (2.84). Again, the Table shows the group mean of the MT. The order of awareness of the MT in term of the group mean were as follow: Instant Messaging Tools (4.94), Social Media Tool (4.92), and, Mapping and Geo-referencing tools (3.95). Others include Digital Documentation and Validation with Scanning tools (3.69), Specialised Real Estate tools (3.49) and Measurement, Conversion and Calculation tools (2.94). The results show that the practitioners were more aware of general-purpose tools such as those associated with instant messaging and document exchange; and, mapping and geo-referencing tools than specialised designed real estate tools. This implied that the practitioners were only familiar with the common tools in mobile technology while other sophisticated software and apps are yet to gain popularity among the practitioners. This result buttressed earlier findings in Olukolajo et al. (2015) and Ullah et al. (2018) where it was revealed that the real estate practitioners were less aware of specialised real estate tools. The reason for this perhaps might be as a result of the training of real

estate practitioners in Nigeria at first degree level which touches very little on the use of technology. Meanwhile most of the practitioners had first degree as their highest level of education. This in turn suggests that higher education might be encouraged to fill the skill gap or such knowledge be incorporated into undergraduate curriculum.

Table 3 also reveals that mobile technology with a high level of utilisation (mean > 4.0) includes electronic mailing system; Google Earth and Google Map; and, Social Media; while those with a low level of utilisation (mean < 2.0) includes Argus Valuation, Sitegist and Vert. This result shows that the general-purpose tools are more utilised across all aspects of the profession as also discovered in Oyetunji et al. (2018) and Olukolajo et al. (2015). Similarly, the study of Babatunde et al. (2016) also ranked social media and email among the highly utilised tools for real estate in their study. This might be because they are being used in almost all professions, and they have gained popularity among the people. Also, they save time and cost with free operation on all smartphones, and might not require any formal training for their operation. Meanwhile, despite the opportunities offered by some mobile technologies such as Vert and Argus Valuation they were hardly utilised by the respondents. The finding of this study on low utilisation of specialised real estate applications complements the findings in Olapade and Ekemode (2018) and Aihie (2019). The reason for this might be as a result of lack of information about the availability of such tools and scarce knowledge on their potential.

Again, when the average level of awareness is compared with the level of utilisation as revealed in Table 3, it was discovered that the average level of awareness (3.77) is higher than the average level of utilisation of mobile technology in Valuation (3.09), Property Management (2.96), and Agency (3.05). The result shows that Valuation has the highest utilisation level while Property Management has the lowest utilisation level. The reason for this could be that the respondents mostly deal with valuation rather than with property management; although, the area of specialisation of the respondents was not explored in the study. Meanwhile, Figure 1 presents the level of awareness and utilisation of mobile technology in each aspect of the real estate profession side by side using a bar chart to compare the mean score.

**Table 3** Level of awareness and utilisation of mobile technology (MT) for real estate practise

| Mobile Technologies (MT) | Awareness Level of MT | Utilisation of MT for Valuation | Utilisation of MT for Property Management | Utilisation of MT for Agency |
|---|---|---|---|---|
| **Instant messaging and document exchange tools** (Electronic Mailing System) | **4.94** | **4.88** | **4.90** | **4.84** |
| **Social Media tools** | **4.92** | **4.84** | **4.80** | **4.80** |
| **Mapping and Geo-referencing tools** | | | | |
| GPS | 4.68 | 4.00 | 2.68 | 3.64 |
| Google Earth and Google Map | 4.60 | 4.22 | 4.08 | 4.08 |
| Sitegeist | 2.58 | 1.96 | 1.86 | 1.76 |
| **Group Mean** | **3.95** | **3.39** | **2.87** | **3.16** |
| **Cloud Storage Tool** | | | | |
| Dropbox | 3.56 | 2.78 | 2.60 | 2.72 |
| Computerized Database | 4.18 | 3.70 | 3.62 | 3.58 |
| **Group Mean** | **3.87** | **3.24** | **3.11** | **3.15** |
| **Digital Documentation and Validation with Scanning Tools** | | | | |
| PDF escape | 3.50 | 2.84 | 2.76 | 2.58 |
| Cam Scanner | 4.26 | 3.94 | 3.90 | 3.96 |
| Evernote | 3.88 | 2.46 | 2.18 | 3.28 |
| Dotloop | 3.10 | 2.12 | 2.18 | 2.48 |
| **Group Mean** | **3.69** | **2.84** | **2.76** | **3.08** |
| **Specialised Real Estate Tools** | | | | |
| DIY landlord | 3.52 | 2.48 | 2.72 | 2.66 |
| Eva Property.com | 3.44 | 2.58 | 2.56 | 2.68 |
| Argus Valuation | 2.84 | 1.92 | 1.60 | 1.54 |
| Property Management Software | 4.14 | 3.50 | 3.86 | 3.48 |
| **Group Mean** | **3.49** | **2.62** | **2.69** | **2.59** |
| **Measurement Conversion and Calculation Tools** | | | | |
| Mortgage Calculator | 3.36 | 2.60 | 2.36 | 2.28 |
| Vert | 2.52 | 1.78 | 1.60 | 1.52 |
| **Group Mean** | **2.94** | **2.19** | **1.98** | **1.90** |
| **Overall Mean** | **3.77** | **3.09** | **2.96** | **3.05** |

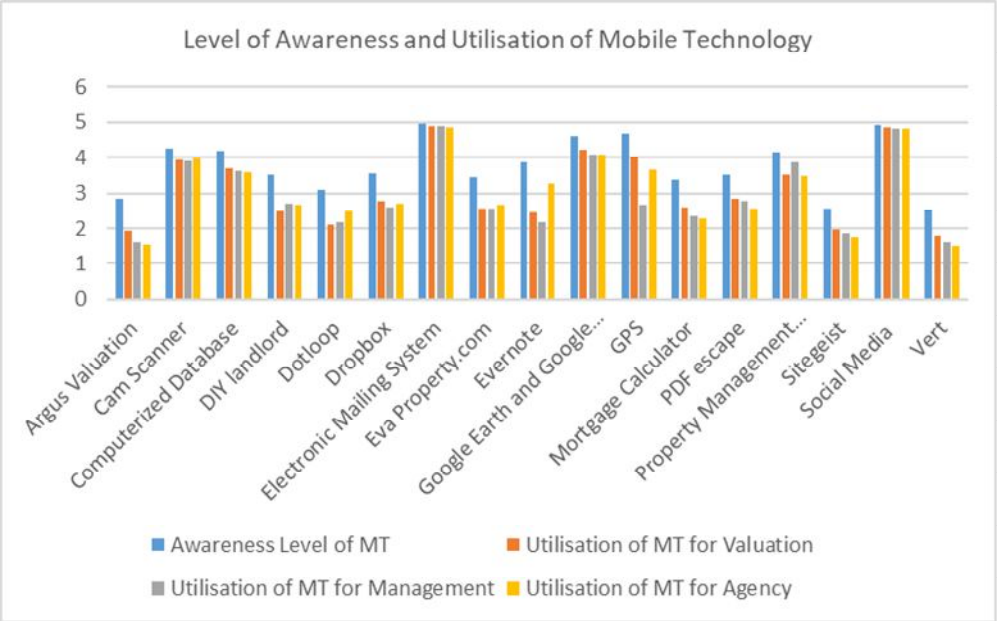


**Figure 1** Bar chart presentation of level of awareness and utilisation of mobile technology

The results show that while there were slight variations in the level of awareness and utilisation; the mobile technology with a high level of awareness equally have a high level of utilisation across the areas of professional practice. Similarly, it was also observed that some mobile technologies are more utilised for some specific professional areas for instance DIY landlord are more utilised for property management and agency activities; Argus Valuation for valuation and property management software for property management. This is understandable as such specialised mobile technology are suited for specific usage as against the generic ones that can be used in all fields. Again, it was also observed from Figure 1, that generally, the awareness level of mobile technology is higher than their level of utilisation. The result is similar to the findings in Olapade and Ekemode (2018) where it was discovered that awareness of BIM technology does not determine its utilisation. The reason for the disparity in awareness and utilisation of some of the mobile technology could be as a result of the cost associated with their installation and use as well as the expertise required for their use. Again, It can be concluded that the respondents were aware of the mobile technologies while only the general-purpose tools i.e. Electronic Mailing System, Social Media apps, Google Earth and Google Map, were put to use often while CamScanner, GPS, property management software and computerized database were sometimes used in all the aspects of real estate practice This could be associated to the fact that they were useful in all aspects of real estate and also cost-effective without serious formal training for their use. Meanwhile, those that were specialized for real estate practice like Argus valuation, DIY landlord and Eva property.com were rarely used. The reason for this might be as a result of the cost of purchase, installation, training the staff and renewal of licence for these applications which are not open source applications.

## ■6.0 CONCLUSION

Mobile technology allows accurate and timely delivery of activities. Meanwhile, despite the opportunities offered by technologies for quality service delivery, its adoption and usage in real estate are limited. This study examined the level of awareness and usage of mobile technology in real estate practice.

The results revealed that almost all the valuers in the study area were familiar with most of the mobile technologies being used for real estate activities but the level of utilisation of the mobile technologies across all aspects of real estate practice was low. This result corroborated with earlier studies such as Olapade and Ekemode (2018) and Aihie (2019) that established low level of adoption of certain technology in the real estate industry. The implication of this is that many practitioners will not be able to benefit from its advantage of using mobile technology such as the mobility, opportunity for remote working and hence quality job delivery the technology offers. This could have a negative effect on the service delivery of real estate firms in the future where such technology will become indispensable given the everchanging demand of the real estate clients. Inability to efficiently and effectively meet client demands, may lead the clients to seek services from non-professionals, with the attendant consequences on the profession.

Against this background of low utilisation of mobile technology proper advocacy and enlightenment of practitioners on the benefits of mobile technology will be required. This could be achieved by Continuous Professional Development by the professional body. Similarly, in-house training could also be organised by real estate firms for their staff on the use of applicable mobile technology for their services. It should however be noted that there could be some underlying factors such as security issues and cost of acquisition of technology that could be the reason why some practitioners are averse to the use of mobile technology. This might require further investigation.

While the study did not explore the relationships that exist between the profile of the respondents' firms and adoption of mobile technology for real estate practise and limited in geographical coverage; it is, however, a pioneer attempt at examining the awareness and utilisation of mobile technology for different aspects of real estate practice. Meanwhile, the study could be extended to address these issues. Possible areas of future research could include comparison across different geographical areas, better comparison across different areas of specialisation among practitioners in the real estate. Other areas include comparison across company size, and in-depth understanding of the educational and training background of the practitioners.

## Acknowledgement

The authors would like to express their profound gratitude to the three reviewers and the editor for their useful comments and contributions which have improved the article.

## References

Adeyemo, A. A., Kemiki, O. A., Adama, U. J., & Ayoola, A. B. (2015). Factors influencing the use of information and communication technology in real estate practice in Minna. *ATBU Journal of Environmental Technology, 8*(2), 1-10.

Aihie, V. U. (2019). The PropTech revolution: The imperatives for Nigeria's estate surveying and valuation professionals to catch up or get left behind. *Journal of African Real Estate Research, 4*(2), 56-75.

Babatunde, T. O., Ajayi, C. A., & Oladokun, T. T. (2016, February). The use of social media in real estate transactions in Lagos, Nigeria. In A. O. Windapo, S. J. Odediran & A. Adediran (Eds.), *Proceedings of the 9*th *CIDB Postgraduate Conference* (pp. 538-549). Cape Town: Department of Construction Economics and Management, University of Cape Town.

Baum, A. (2017). *PropTech 3.0: The future of real estate*. Oxford: Saïd Business School. Available from https://www.sbs.ox.ac.uk/sites/default/files/2018-07/PropTech3.0.pdf

Baum, A., Saull, A., & Braesemann, F. (2020). *PropTech 2020: The future of real estate*. Oxford: Saïd Business School. Available at https://www.sbs.ox.ac.uk/sites/default/files/2020-02/proptech2020.pdf

Chiedu, H. H. (2010). *Assessment of the application of the information and communication technology in real estate practice (A case study of Lagos Metropolis)* (Master's thesis). University of Nigeria, Enugu, Nigeria. Retrieved from https://www.unn.edu.ng/publications/files/images/HALIM%20HENRY%20CHIEDU.pdf

Cistematix. (2011, June 30). Industry analysis of the Nigerian mobile technology development. Retrieved on 22 October 2020 from http://gsl.mit.edu/media/programs/nigeriasummer-2011/materials/cistematix_industry_analysis_of_the_nigerian_mobile_ technology.pdf

Cradduck, L. (2013, January). *Mobile valuations: The internet's impact on traditional valuation services.* Paper presented at the 19th Annual Pacific Rim Real Estate Society Conference, Melbourne, Australia.

Elile, R. U., Akpan, S. A., & Raju, V. (2019). Real estate investment performance and macroeconomic dynamics in Nigeria: A sectoral analysis. *World Journal of Research and Review, 8*(2), 18-26.

Halvitigala, D., & Gordon, J. (2014, January). *The use of property management software in residential property management*. Paper presented at the 20th Annual Pacific Rim Real Estate Society Conference, Christchurch, New Zealand.

Ibisola, A. S., Adetokunboh, O., & Sodiya, A. K. (2018). Effective social media marketing of real estate product in Abeokuta, Nigeria. In M. Gupta (Ed.), *Social media & new generation*. Pune: Eureka Publication.

Ibisola, A. S., Oni, A. S., & Peter, J. N. (2015, May). *The relevance and application of ICT in estate surveying and valuation in Ogun State.* Paper presented at the International Conference on African Development Issues (CU-ICAD) 2015, Ota, Ogun, Nigeria.

Jud, G. D., Winkler D. T., & Sirmans, G. S. (2002). The impact of information technology on real estate licensee income. *Journal of Real Estate Practice and Education, 5*(1), 1-16.

Kakulu, I. I. (2003). *A computerized approach real estate practice in Nigeria.* Port Harcourt: IBK Publications.

Lai, C. H., Yang, J. C., Chen, F. C., Ho, C. W., & Liang, J. S. (2009). Mobile technology supported experiential learning. *International Journal of Instructional Media, 36*(1), 41-53.

Lizam, M. (2019). Digital technology and the real estate industry. *SINERGI, 9*(2), 42-50.

Macwan, U. (2017, April 24). Mobile technology, its importance, present and future trends. Retrieved on 15 February 2020 from https://www.finextra.com/latest-blogs/payments?memberid=90606

Nwanekezie, O. F., & Okeahialam, S. A. (2019*).* A study of social media usage among estate surveyors and valuers in real estate agency in Uyo, Nigeria. *International Journal of Applied Sociology, 9*(1), 10-14.

O'Dea, S. (2020, December 7). Smartphone users in Nigeria 2014-2025. Retrieved on 25 January 2021 from https://www.statista.com/statistics/467187/forecast-of-smartphone-users-in-nigeria/

Olaniyi, S. S., Udoh, E., Oyedare, B. A., & Adegoke, Q. (2006, October). *Application of GIS in estate management (A case study of Araromi Phase IV, Oyo, Nigeria).* Paper presented at the XXIII FIG Congress, Munich, Germany.

Olapade, D. T., & Ekemode, B. G. (2018). Awareness and utilisation of building information modelling (BIM) for facility management (FM) in a developing economy: Experience from Lagos, Nigeria. *Journal of Facilities Management, 16*(4), 387-395.

Olapade, D. T., Ayodele, T. O., & Olaleye, A. (2018). Impediments to foreign real estate investment in an emerging market: A tripartite characterisation of the Lagos, Nigeria property market. *Journal of Property Investment & Finance, 36*(5), 479-494.

Olufunso, A. P. (2019, May 14). *PropTech in Nigeria: The revolution*. Retrieved on 31 May 2020 from https://lawaxis360degree.com/2019/05/14/proptech-in-nigeria-the-revolution

Olukolajo, M. A., Babajide, O., & Akinwamide, D. O. (2015). Assessment of use of social media in real estate transactions in Lagos property market. *American Journal of Economics, Finance and Management, 1*(2), 63-68*,*

Oyetunji, B. O., Ojo, B., & Oyetunji, A. K. (2018). ICT utilization status and challenges in the Nigerian real estate practice. *Journal of Information Science, Systems and Technology, 2*(2), 28-39.

Parker, D., & Robinson, J. (2002, January). *Property valuation software packages: An evaluation*. Paper presented at the 8th Annual Pacific Rim Real Estate Society Conference, Christchurch, New Zealand.

Pimentel, J. R. (1999). Design of net-learning systems based on experiential learning. *Journal of Asynchronous Learning Networks, 3*(2), 64-90.

Poynter, R. (2015). The utilization of mobile technology and approaches in commercial market research. In D. Toninelli, R. Pinter & P. de Pedraza (Eds.), *Mobile research methods: Opportunities and challenges of mobile research methodologies* (pp. 11-20)*.* London: Ubiquity Press.

Reding, A., Golby, A., Rulffes, A., Marinchick, N., & Quinn, T. (Eds.) (2014). Mobile apps help free up appraisers (Appraisal Technology Report). *Valuation Review*, June, 5-6.

Siniak, N., Kauko, T., Shavrov, S., & Marina, N. (2020). The impact of proptech on real estate industry growth. *IOP Conference Series: Materials Science and Engineering, 869*, 062041.

Tagliaro, C., Bellintani, S., & Ciaramella, G. (2021). R.E. property meets technology: Cross-country comparison and general framework. *Journal of Property Investment & Finance, 39*(2), 125-143.

Technostacks. (2019, September 24). Why use mobile apps in real estate industry? Retrieved on 26 January 2020 from https://technostacks.com/blog/why-use-mobile-apps-in-real-estate-industry.

Ullah, F., Sepasgozar, S. M. E., & Wang, C. (2018). A systematic review of smart real estate technology: Drivers of, and barriers to, the use of digital disruptive technologies and online platforms. *Sustainability, 10*(9), 3142.

Warburton, D. (2016). *The role of technology in the real estate industry* (Master's thesis). University of Cape Town, Cape Town, South Africa. Retrieved from https://open.uct.ac.za/handle/11427/22804

Watson, D. (2001). Dissociations of the night: Individual differences in sleep-related experiences and their relation to dissociation and schizotypy. *Journal of Abnormal Psychology, 110*(4), 526-535.