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Factors Influencing the Adoption of Technology in Pharmaceutical Service Delivery in Tertiary Hospitals in Southwestern Nigeria

Omoniyi J. Ola-Olorun[1*], Timothy O. Oyebisi[2], and Margaret O. Afolabi[1]
[1]Dept. of Clinical Pharmacy and Pharmacy Administration, Obafemi Awolowo University, Ile-Ife. Nigeria.
[2]African Institute for Science Policy and Innovation, Obafemi Awolowo University, Ile-Ife. Nigeria.

*Corresponding author
Email: niyiolaolorun@gmail.com

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Abstract

The aim of this chapter is to identify those factors determining the adoption of technology in pharmaceutical service delivery in selected tertiary hospitals in Southwestern Nigeria. The study was a cross-sectional survey of 132 pharmacists who were randomly selected from a pool of 186 pharmacists in eight of the sixteen tertiary hospitals in Southwestern Nigeria. Primary data were collected using a pre-tested structured questionnaire with items on a 5-point Likert scale of importance and weighting scores of 1-5. The data were analysed with the aid of SPSS statistical package version 21 using descriptive statistics including relative significance indexes (RSI) as well as ANOVA inferential statistics at $p<0.05$. The results show that the respondents' knowledge (RSI = 0.96), skill in the application of technology (RSI = 0.94), quality of output of the technology (RSI = 0.91) and relative advantage over current technology (RSI = 0.91), were the key adoption influencing factors (F = 14.062, $p<0.05$). The chapter concludes that the main factors determining the adoption of technology in pharmaceutical service delivery in tertiary hospitals were pharmacists' knowledge of technology and skill in the application the technology, among others.

Keywords: *Adoption of technology; Pharmaceutical service delivery; Tertiary hospitals; Adoption factors*

1.0. Introduction

Technology orientation in healthcare delivery has become entrenched as a result of its demonstrated effectiveness in delivering patient-centred services with improved cost-effectiveness, efficiency, safety, and quality control (Lee and Meuter, 2010; Lapum *et al*., 2012). The increasing maturity of information technologies (IT) in hospitals and their infrastructure development is improving the quality and efficiency of healthcare services (Escobar-Rodríguez and Romero-Alonso, 2014), and pharmaceutical service delivery in the hospitals has not been left out of it (ASHP, 2007; Wachter, 2016. There is consensus that IT has significant effects on the productivity of firms and these effects will only be realized if, and when, IT are widely spread and used (Oliveira and Martins, 2010). Technology is a resource and adoption of technology can have a profound influence on an organisation's productivity and competitiveness (Escobar-Rodríguez and Romero-Alonso, 2014). Technology is a tool for enhancing service effectiveness and improving efficiency and the universal impact of technology on business, industry and society cannot be questioned (Escobar-Rodríguez and Romero-Alonso, 2014). A number of studies have shown that the adoption of technology would greatly enhance the pharmacy profession, especially clinical practice (Tribble *et al.*, 2009; Wachter, 2016). The study of the factors influencing adoption will provide an insight into how best to facilitate acceptance and use of cutting-edge technologies and overcome barriers to the adoption of technology in pharmaceutical service delivery in hospitals (Escobar-Rodríguez and Romero-Alonso, 2014).

One of the greatest challenges facing the pharmacy profession in hospitals is being more effective in service to patients in the medication use process especially by being able to render more services to them beyond the dispensing of medicines (Kelly, 2006; Kennedy, 2018). Evidence from literature shows there is a problem of inefficiency and compromise of effectiveness in pharmaceutical service delivery in hospitals in Nigeria (Afolabi, 2005) and those pharmacists perceive some fear which may act as a barrier to technology adoption (Afolabi and Oyebisi, 2007). Moreover, there is limited information on factors influencing the adoption of technology in pharmaceutical service delivery in hospitals. Therefore, the objective of the study is to investigate the factors influencing the adoption of technology in pharmaceutical service delivery in the selected tertiary hospitals in South Western Nigeria.

2.0. Literature Review

2.1. The adoption factors theories

The evolution of diffusion/adoption theories began with Roger's (1995) innovation decision process theory which he propounded that people's attitude toward an innovation is a key element in its diffusion and potential adopters of an innovation progress over time through five stages in the diffusion process namely knowledge, persuasion, decision, implementation, and confirmation (Rogers, 1995) and that five perceived attributes of the innovation normally determine the adoption which include relative advantage, compatibility, complexity (simplicity), trialability, and observability (Rogers, 1995). The theories behind the adoption of innovations have built up over time and are now numerous. Some of them are the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003), which aims to explain user intentions to use a technology and subsequent user behaviour building upon earlier theories such as the theory of reasoned action (Fishbein and Ajzen, 1975), the theory of planned behaviour (TPB) (Ajzen, 1991) and the technology acceptance model (TAM) (Bagozzi *et al*., 1992). It takes into account several constructs including performance expectancy, effort expectancy, social influence, and facilitating conditions as direct determinants of user intention and behaviour (Venkatesh *et. al*., 2003). Sandberg and Wahlberg (2006) reviewed the Unified Theory of Acceptance and Use of Technology (UTAUT) model and came up with an adaptation of it by bringing in new variables such as subjective norm, image, internalization and identification. Other prominent ones are diffusion on innovation (DOI) theory, and the technology, organization, and environment (TOE) framework (Oliveira and Martins, 2011). The DOI found that individual characteristics, internal characteristics of organizational structure, and

external characteristics of the organization are important precursors of organizational innovativeness (Oliveira and Martins, 2010). The TOE framework identifies three aspects of an enterprise's context that influence the process by which it adopts and implements a technological innovation as technological context, organizational context, and environmental context (Oliveira and Martins, 2010).

Adoption of technology affects not only organisational structure but also affects, and is affected by, organisational culture (Souder and Sherman, 1994). It is to a large extent determined by communication systems, training and labour-management relations (Souder and Sherman, 1994). In other to take advantage of the potential positive influence of organisational culture in technology adoption, managers and policy makers must enhance labour management relations, better the communication systems, develop effective training and selection policies as well as performance appraisal and compensation policies (Souder and Sherman, 1994). Tribble *et al.* (2009) argue that technology adoption necessarily changes workflow and this creates anxiety among people who have become accustomed to it. Changes in organisational structure and flows are both the inevitable consequences and the prerequisites for the successful adoption of new technology (Aydin, 1989).

Thong and Yap (1995) classified into two the organisational variables that are important in determining adoption of innovation namely individual characteristics of the Chief Executive Officer (CEO) and organisational characteristics. Three CEO characteristics namely innovativeness, attitude towards adoption of IT, and IT knowledge were studied. The three organisational characteristics studied are business size, competitiveness of environment, and information intensity. Au and Enderwick (1999) found that the cognitive process which determined an attitude towards technology adoption was to be affected by six beliefs namely compatibility, enhanced value, perceived benefits, adaptive experiences, perceived difficulty and suppliers' commitment. Gender, age, experience, and voluntariness of use are posited to mediate the impact of the four key constructs on user intention and behaviour (Venkatesh *et al*., 2003). It has been reported that Hospital adoption of IT is associated with desirable quality outcomes across hospitals in Florida (Menachemi *et al*., 2008) and McCullough (2008) found that IS adoption is influenced by multi hospital system membership, payer mix, and hospital scale, but that strategic behaviour, hospital ownership, and hospital competition had only little effects on IS adoption.

Nilashi *et al.* (2015) identified technological, organizational, environmental and human factors as driving or inhibiting the HIS adoption. Nyaggah (2015) also reported that the cost of ICT training materials, the cost of installation of ICT infrastructure and ICT staff attitude on ICT adoption were factors playing a major role. In a study examining the factors affecting PDA acceptance among physicians (Basak *et al*., 2015) found that perceived usefulness and perceived ease of use were key factors explaining physicians' intention to use PDA technology. Hospital size, hospital age, urban location and information technology were found to be important determinants of the efficiency levels in Malaysian hospital pharmacy services (Hamzah and See, 2019). Also, Alam *et al*. (2020) found that factors influencing the adoption of mHealth services in Bangladesh include performance expectancy, social influence, facilitating conditions and perceived reliability which positively influenced the behavioural intention to adopt mHealth services. Gender was found to have a significant moderating effect on mHealth services adoption in certain cases (Alam *et al*., 2020). Ahmadi *et al*. (2015) concluded that the study of factors can provide directions which hospitals may take to achieve a better HIS adoption decision making (Ahmadi *et al*., 2015).

There is a widespread perception that information systems' diffusion is slow in hospitals and a better understanding of the mechanisms driving IS adoption is needed (McCullough, 2008). The study of factors would help to provide directions for future research to demonstrate how hospitals may utilise the findings to achieve a better HIS adoption decision making (Ahmadi *et al*., 2015). In a Systematic

review by Handayani *et al*. (2017) who reviewed the literature on the most important acceptance factors associated with Hospital Information Systems (HIS) and related technologies, Handayani *et al*. (2017) found 15 user acceptance factors related to HIS and related technologies that were frequently identified by a minimum of five previous studies and the factors were related to individual, technological, and organizational factors. In a study that aimed to identify the critical factors affecting the adoption of mHealth in healthcare system of Bangladesh by employing the Unified Theory of Acceptance and Use of Technology (UTAUT) model, Alam *et al*. (2020) found that performance expectancy, effort expectancy, social influence, facilitating condition and perceived reliability were significant factors determining acceptance and use of Mobile Health (mHealth) in Bangladesh.

3.0. METHODS

3.1. Conceptual Framework

The conceptual framework designed for the study was a synthesis from the unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al*., 2003), the theory of reasoned action (Fishbein and Ajzen, 1975), the theory of planned behaviour (TPB) (Ajzen, 1991) and the technology acceptance model (TAM) (Bagozzi *et al*., 1992). The principal dependent variable of the study was the adoption of technology in pharmaceutical service delivery and the independent variables were the factors influencing adoption including users', technology, management, organisational, economic, infrastructural, and social/environmental factors.

3.2. Population and Sampling procedure

The population of the study comprises all the sixteen tertiary hospitals in the Southwestern zone of the Federal Republic of Nigeria. The sampling frame included all pharmacists in the hospitals. Eight of the sixteen tertiary hospitals were purposively selected for better matching of the sample to the objectives of the study (Campbell *et al*., 2020). The study sample consisted of pharmacists who were on the staff of the selected hospitals. The population of the study consists of 186 pharmacists, including the Heads of Pharmacy Department in each of the selected hospitals.

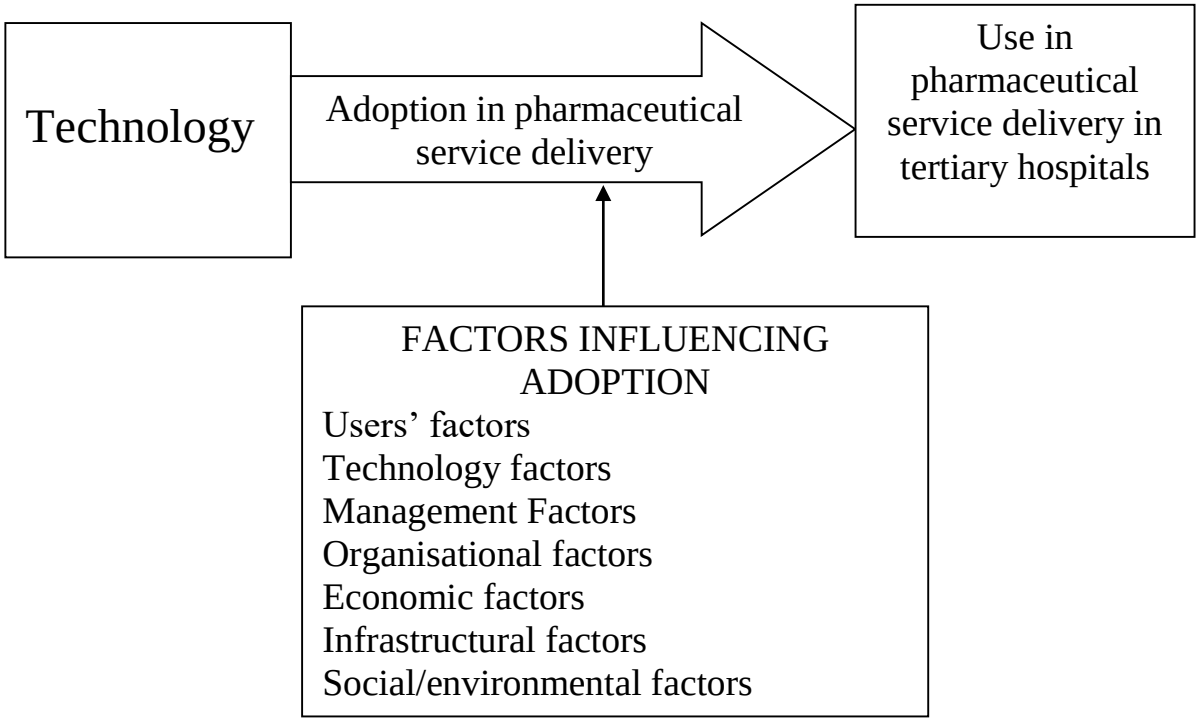

Figure 1: Conceptual Framework Showing Factors Influencing Adoption of Technology in Pharmaceutical Service Delivery in Tertiary Hospitals in Southwestern Nigeria

3.3. Design of the Questionnaire

The questionnaire which was the primary instrument for data collection contained mostly closed-ended questions. The questionnaire was compiled from literature based on the grouping of the items for data collection which have been based on the several theories including the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975, the theory of planned behaviour (TPB) (Ajzen, 1991), the technology acceptance model (TAM) (Bagozzi *et al*., 1992) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003). The questionnaire was constructed in simple statements free of ambiguity. The factors were categorised into user, technology, management, organisational, economic, infrastructural and social/environmental factors and measured with the aim of establishing those that are important in the adoption process in pharmaceutical service delivery in the tertiary hospitals. They had five-alternative responses; A (Very Important), B (Important), C (Slightly Important), D (Not Important), and E (Not Applicable).

3.4. Validity of Questionnaire

The construct validity was ascertained by the professional judgement of hospitals staff and a test developer. The questionnaire was pre-tested among ten hospital pharmacists who were not part of the study sample by subjecting it to a test-retest reliability check over a two-week period. The comments and suggestions made by the respondents were employed in improving the quality of the questionnaire. Cronbach's alpha was used to assess the internal consistency of the entire scale which gave a value of 0.88. Since all of the items had an alpha above 0.69, the scale is suitable for analysis with acceptable reliability and all constructs exhibited strong internal reliability.

3.4. Method of Data Collection

Ethical approval was obtained from the authorities of the selected hospitals in order to conduct the study. Initial visits were conducted to establish rapport with the participants and to prepare the ground for the process of data collection. The consent of the respondents was sought and the appropriate questionnaire administered to all pharmacists.

3.5. Method of Data Processing and Analysis

Relevant data collected in this study using questionnaire, were edited, sorted and coded as appropriate. They were analysed using descriptive and inferential statistics. The data were fed into the computer using Statistical Package for the Social Sciences software (version 21). Descriptive statistics techniques such as frequency counts, percentages, measures of central tendency and Relative Significance Index (RSI) were used to organise and summarise the data. The Relative Significance Index (RSI) was used in ranking the factors determining adoption of technology in order of importance. The RSI is a type of index used in ranking items based on responses obtained from scaled alternatives in questionnaire survey (Adebowale and Ojo, 2009). The items can thereafter be ranked by the RSI values starting from the largest to the smallest to determine the relative importance of the items (or factors).

4.0. Results

Table 1 presents the mean rating of importance scores and the relative significance index (RSI) values of factors identified as determining the adoption of technology in pharmaceutical service delivery. The RSI values were further subjected to ANOVA and Duncan Multiple Range post hoc test to determine the significant differences among the factors. The RSI values showed that the ten most important factors were users' knowledge of the technology (4.80, rsi 0.96); pharmacists' (users') skill in application (4.70, rsi 0.94); Quality of the output of the technology (4.55, rsi 0.91); relative advantage over current technology (4.55, rsi 0.91); cost of purchase of the technology (4.50, rsi 0.90); cost of running the technology (4.50, rsi 0.90); available tool/infrastructure for using the technology (4.45, rsi 0.89); relevance to one's job (4.40, rsi 0.88); perceived need of the technology (4.30, rsi 0.86); and, perceived usefulness of the technology (4.25, rsi 0.85).

There was a significant difference (F = 14.062, $p<0.05$) in the RSI values of the factors. The factors pertaining to the pharmacists as end-users were grouped into users' sophistication-, users' persuasion-, users' decisional- and users' personal factors. Among the users' sophistication factors, the RSI values of pharmacists' (users') knowledge of technology (4.80, rsi 0.96) and pharmacists' (users') skill in application (4.70, rsi 0.94) show that the items were rated as very important and were significantly the same, whereas the pharmacists' year of experience was only rated slightly important (3.20, rsi 0.64). With regard to users' persuasion factors, all the four items employed in measuring users' persuasion factors were rated as important averaging (4.28, rsi 0.86), the RSI values of perceived usefulness of technology (4.25, rsi 0.85), perceived ease of use of technology (4.15, rsi 0.83), perceived need of the technology (4.30, rsi 0.86) and relevance to one's job (4.40, rsi 0.88) were significantly the same and rated as important factors. The three users' decisional factors included 'possibility of trial-use of the technology' (4.20, rsi 0.84), 'possibility of physically observing the result of the use of technology during application' (4.05, rsi 0.81) and 'immediacy of the benefit of using the technology' (4.05, rsi 0.81) were significantly the same and rated important.

The users' personal factors were five in number and include users' freedom to use the technology (voluntariness) (3.90, rsi 0.78) and negative attitude resulting from ignorance (3.60, rsi 0.72) were significantly the same. They were considered important along with ethical considerations in the use of the technology (4.20, rsi 0.84), which RSI value was significantly different. Pharmacist-users' personal likes and dislikes (3.20, rsi 0.64) was considered only slightly important.

Among technology related factors, quality of the output of the technology (4.55, rsi 0.91) and relative advantage over current technology (4.55, rsi 0.91) were rated as very important with RSI values that were significantly the same. Similarly, environmental impact (4.20, rsi 0.84), licence for use (4.05, rsi 0.81) and compatibility with existing system (4.00, rsi 0.80) had RSI values that were significantly important, whereas riskiness of purchase such as uncertainty in reliability of the technology (3.95, rsi 0.71) had significantly different but equally important RSI values.

Concerning management factors, the chief executive officer's (CEO's) innovativeness (4.10, rsi 0.82), CEO's attitude (4.05, rsi 0.81) and CEO's knowledge (4.00, rsi 0.80) which were rated important, had RSI values that were significantly the same, whereas management's regulation of use of technology, also rated important, had a significantly different RSI value (3.95, rsi 0.79). There was also a significant difference in the RSI values of organisational factors. Issues such as 'if changes would be regarded in the physical structure of the department' (4.05, rsi 0.81), hospital's business plan/strategy (4.05, rsi 0.81) and availability of technical staff to operate technology (4.25, rsi 0.85) were rated important and had RSI values that were significantly the same. Other issues such as 'if changes will be required in the staffing structure of the department' (3.95, rsi 0.79), selection process (3.90, rsi 0.78), hospital size (3.70, rsi 0.74), hospital ownership (3.55, rsi 0.71) and type of hospital (3.50, rsi 0.70) were all rated as being slightly important and had RSI values that were significantly the same. Hospital location (3.50, rsi 0.70) was rated as slightly important and had a significantly different RSI value.

Economic factors which included cost of purchase of technology (4.50, rsi 0.90) and cost of running the technology (4.50, rsi 0.90) had significant difference in their RSI values and considered very important respectively. Infrastructural factors consisting of available tool/infrastructure for using the technology (4.45, rsi 0.89) and communication channel types such as mass media (3.80, rsi 0.76) both had significantly different RSI values and considered very important and important respectively.

Table 1: Mean Rating of Importance and Relative Significance Index (RSI) Values of Factors Influencing Adoption of Technology.

Factors	Mean rating of importance	RSI Values
Users' factors		
Users' Sophistication factors		
Pharmacists' (Users') knowledge of the technology.	4.80[a]	0.96
Pharmacists' (Users') skill in application.	4.70[a]	0.94
Pharmacists' years of experience.	3.20[c]	0.64
Users' Persuasion factors		
Perceived usefulness of the technology.	4.25[ab]	0.85
Perceived ease of use of the technology.	4.15[ab]	0.83
Perceived need of the technology.	4.30[ab]	0.86
Relevance to one's job	4.40[ab]	0.88
Users' Decisional factors		
Possibility of trial-use of the technology (before adoption)	4.20[ab]	0.84
Possibility of physically observing the result of the use of technology during application.	4.05[ab]	0.81
Immediacy of the benefit of using the technology	4.05[ab]	0.81
Users' Personal factors		
User's freedom (voluntariness) to use the technology	3.90[b]	0.78
Ethical considerations in the use of the technology	4.20[ab]	0.84
Social considerations resulting from the use of the technology	3.85[b]	0.77
Pharmacists' (users') personal likes and dislikes.	3.20[c]	0.64
Negative attitude resulting from ignorance	3.60[b]	0.72
Technology factors		
Quality of the output of the technology	4.55[a]	0.91
Relative advantage (over current technology	4.55[a]	0.91
Environmental impact (e.g., noise making, odour emission etc).	4.20[ab]	0.84
Licence for use	4.05[ab]	0.81
Compatibility with existing system	4.00[ab]	0.8
Riskiness of purchase (e.g., uncertainty in reliability) of the technology.	3.95[b]	0.79

Means of the same letter along the same column within the same elements of each dimension are not statistically significant ($F = 14.062$, $p<0.05$).

Table 1 (Contd.): Mean rating of importance and relative significance index (RSI) values of factors influencing adoption of technology

Factors	Mean rating of importance	RSI Values
Management Factors		
Management's regulation of use of the technology	3.95[b]	0.79
Chief Executive Officer's (CEO) innovativeness	4.10[ab]	0.82
CEO's attitude	4.05[ab]	0.81
CEO's knowledge	4.00[ab]	0.80
Organisational factors		
If changes will be required in the staffing structure of the department.	3.95[b]	0.79
If changes will be required in the physical structure of the department.	4.05[ab]	0.81
Selection process	3.90[b]	0.78
Hospital size	3.70[b]	0.74
Hospital ownership	3.55[b]	0.71
Hospital location	3.50[c]	0.70
Type of hospital (Teaching, FMC, Federal-owned, State-owned)	3.50[b]	0.70
Hospital's business plan/strategy	4.05[ab]	0.81
Availability of technical staff to operate technology	4.20[ab]	0.84
Economic factors		
Cost of purchase of the technology	4.50[ab]	0.90
Cost of running the technology	4.50[ab]	0.90
Communication channel types	3.80[a]	0.76
Infrastructural factors		
Available tool/infrastructure for using the technology	4.45[ab]	0.89
Social/environmental factors		
Information sources (e.g., journals, salespersons, advertisements)	4.15[ab]	0.83
Social interaction process among users	3.80[b]	0.76
External social participation	3.45[c]	0.69
Supplier incentive	3.35[c]	0.67
Competition	3.35[c]	0.67

Key

Means of the same letter along the same column within the same elements of each dimension are not statistically significant (F = 14.062, $p<0.05$).

Social/environmental factors also had significant difference in their RSI values. Information sources (4.15, rsi 0.83) was considered important but with significantly different RSI value from social interaction process among users (3.80, rsi 0.76) also rated as important whereas external social participation (3.45, rsi 0.69), supplier incentive (3.35, rsi 0.67) and competition (3.35, rsi 0.67), rated as slightly important, had RSI values that were significantly the same.

5.0. Discussion

The study employed a conceptual framework formed by the amalgamation of several theories including the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975, the theory of planned behaviour (TPB) (Ajzen, 1991), the technology acceptance model (TAM) (Bagozzi *et al*., 1992) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003). The data collected and analysed have provided the results presented above. It could be observed that the respondents rated high such group factors including user, technology, organisational, economic, infrastructural, and social/environmental factors (Oliveira and Martins, 2010). In terms of group's importance, the users' factors, technology factors and economic factors were rated by the pharmacists as the most important factors influencing adoption of technology in pharmaceutical service delivery.

The many numbers of the users' factors and their high (important) rating show that end-user factors are critical to technology adoption and this is in line with extant theories (Rogers, 1995; Fishbein and Ajzen, 1975; Ajzen, 1991; Bagozzi *et al*, 1992; Venkatesh *et al*, 2003; Sandberg and Wahlberg, 2006; Oliveira and Martins, 2010). The emergence of pharmacists' (end-users') knowledge of the technology as the most important factor followed by pharmacists' (end-users') skill confirms the necessity of end-user capability for successful adoption. The awareness of an innovation is the important foundation for its adoption (Rogers, 1995) and this may explain the high values obtained for users' sophistication factors. If knowledge is the foundation, skill makes it applicable and useful. The low value obtained for pharmacists' years of experience and pharmacists' personal likes and dislikes show that personal experience is less important for adoption even in the presence of knowledge and skill (Rogers, 1995; Thong and Yap, 1995; Basak *et al.*, 2015).

The items employed in measuring users' persuasion factors were rated on average as important to show their importance to the respondents. A potential adopter of an innovation would be persuaded before their possibility of adopting the innovation (Rogers, 1995; F&A, 1975; Ajzen, 1991; Bagozzi *et al*; 1992; Venkatesh *et al*, 2003; Oliveira and Martins, 2010). Regarding users' decisional factors, all the items measuring this construct were rated as important. If a potential adopter having been persuaded found an innovation acceptable, they are likely to take a positive action to adopt it. Thus, the outcome of those items which are all important are only building on the respondents' persuasion factors which are equally important in line with the theories of Rogers' (1995), Bagozzi *et al*. (1992), Venkatesh *et al.* (2003) and Oliveira and Martins (2011). Users' personal factors were generally less highly rated than other users' factors by the respondents but still rated as important for adoption. Personal factors, particularly users' voluntariness, are important for adoption and particularly affecting rate of adoption (Thong and Yap, 1995; Oliveira and Martins, 2010). Social considerations are also key to adoption since human beings are social in nature (Thong and Yap, 1995; Venkatesh *et al.*, 2003; Au and Enderwick, 1999; Sandberg and Wahlberg, 2006; Oliveira and Martins, 2010).

Technology factors were also rated as important (4.22, rsi 0.84), particularly quality of the output of the technology and the relative advantage (over current technology) which were rated as (4.55, rsi 0.91) very important to the respondents. This is in line with Rogers' (1995) theory and other theories developed after it such as TAM (Bagozzi *et al*., 1992); the UTAUT (Venkatesh *et al*, 2003); and the TOE (Oliveira and Martins, 2010). The rating as important of all the other technology factors items echoes the importance of technology factors as a whole. Relative advantage measures how improved an innovation is over a competing choice or the previous generation of a product. Potential users would

want to see how an innovation improves their current situation. Relative advantage is a potent factor in adoption since it may even render the old technology obsolete while available tool is part of end-user capability which is essential for successful adoption (Rogers, 1995; Venkatesh *et al.*, 2003; Nyaggah, 2015). Environmental impact and compatibility also rated as important are in line with earlier theories and findings (Thong and Yap, 1995; Oliveira and Martins, 2010).

Management factors were also considered important by the residents. The knowledge, attitude and innovativeness of the CEO were all considered important. Management's regulation of technology was also considered important though significantly less than the former three. Management factors are key to adoption in an organisation as management takes decision on vital issues accompanying adoption of technology (Thong and Yap, 1995; Au and Enderwick, 1999; Sandberg and Wahlberg, 2006; Oliveira and Martins, 2010). Organisational factors were not as highly rated as users' and technology factors or even as management factors but equally important (Avdin, 1989; Oliveira and Martins, 2010). Available tool/infrastructure for using the technology was also rated as important to the respondents. This is probably because the respondents knew that even in the presence of a technology such as a computer, the infrastructure for it to function such as power supply is vital and the absence of power supply infrastructure would ground the computer (Nyaggah, 2015).

Social/environmental factors can be multivarious. Overall, the respondents rated such factors as being important. Information sources such as advertisements, journals and salespersons were considered important as well as social interaction process among users whereas external social participation, supplier incentive and competition were considered only slightly important. This agrees with the report of Oliveira and Martins (2010) and Nilashi *et al.* (2015). Economic factors were rated highly as important by the respondents particularly cost of purchase of equipment and cost of running the technology which were equally rated very important in line with extant literature (Thong and Yap, 1995; Venkatesh *et al*, 2003; Nyaggah, 2015).

In summary, the most important factors influencing adoption of technology in pharmaceutical service delivery were pharmacists' knowledge of the technology, pharmacists' skill in applying the technology, maintenance cost of the technology, relative advantage of the technology over current technology, available tool for using the technology and management commitment to using the technology. The least important factors were found to be pharmacists' years of experience, pharmacists' personal likes and dislikes, supplier incentive, and competition. A limitation was that sampling for the study was purposive, partly due to unresolved obstacles in securing ethical approval in one of the hospitals within the limit of time and resources.

6.0. Conclusion

From the findings of the study, the main factors determining the adoption of technology were pharmacists' knowledge and skill in the application the technology, quality of output of the technology, relative advantage over current technology, and cost of purchase and running the technology, among others. However, pharmacists in the hospital could be encouraged to take up cutting-edge technologies through appropriate training by their professional associations, particularly key decision makers among them; and by incorporating such training pre-service in their undergraduate curriculum.

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