HEALTH INFORMATION SYSTEMS AND PATIENT CARE IN SUB-SAHARAN AFRICA: CASE OF POLYCLINIC IDIMED DOUALA

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Abstract

There is a significant interest in healthcare on the use of Artificial intelligence to support healthcare provision, however the same cannot be said in the developing economies of sub-Saharan Africa. The deteriorating care provision has plagued the African continent, and this has seen an increasing number of private providers of healthcare take the lead in the adoption of Health Information Systems (HIS). A qualitative method using purposive sampling approaches was used. Data was collected through interviews from 13 employees and 2 focus groups sessions at Polyclinic Idimed Douala Cameroon. Thematic analysis helped interrogate their experiences through the theoretical lens of Technological Adoption Model (TAM) literature. There were challenges with understanding the purpose of the HIS, ease of use, poor ICT infrastructure, resistance by employees, inadequate staff training, technophobia, and resistance to change. The findings from this revealed that HIS played a vital role in patient care. It also revealed that developing and undeveloped countries like Cameroon still face a lot of barriers with HIS use. This research represents one of the efforts to examine the challenges of the implementation of the health information system (HIS) and opens the need to contextualise technology adoption in emerging economies within the sub-Saharan Africa region. It highlights culturally nested aspects of the TAM model and represents a pioneering effort to examine the health information system (HIS) use in private healthcare provision in Cameroon. Private health care providers need take into consideration the gaps in the contextual understandings of technology adoption and the realities that applies to them within emerging economies such as Cameroon. The shift from the traditional to modernised health information systems must be managed slowly and carefully.

Keywords: Health Information Systems (HIS), patientcare, technology acceptance, Cameroon, Sub-Saharan Africa
JEL Classification: I15, O35, O33

1. INTRODUCTION

The growth of technology has taken over every business sector (Kadjie et al., 2022), including the health sector. Previous studies suggest that the health sector has adopted Health Information systems to help reduce errors, and costs, make decisions and even provide solutions to different illnesses and hospital-related problems (Florence et al., 2021; Wager, et al., 2021).

With technological advancements, health information systems are designed to offer quick and better patient service. However, there is a need to constantly update and modify the system to meet the new demands of patients. Health information systems are vital in-patient care when used effectively. HIS also enables data analytics which allows hospitals to harness, store and analyse patients' data, thereby cutting costs (Muneeswaran et al., 2021). The exchange of information in a digital format enables hospitals to share patient data across different health providers more timeously or in real-time, and this became more apparent during COVID-19 (Biswas, 2022).

Whilst HIS are advanced and more effective in developed countries and integrated into daily activities at every level (Gebre-Mariam and Bygstad, 2019), only a few hospitals in developing countries, attempt to use HIS but fail to implement it successfully or effectively. Of concern here is that though some health institutions have adopted the HIS in Cameroon, it needs to be utilised more effectively.

The literature suggests that the healthcare system in Cameroon has an average of two doctors for every 10,000 people (Işık and Ndifusah, 2013), which creates a need for the effective use of technological innovations to help improve patient care. Though technological innovations such as the health information system are gaining increasing attention in developing countries like Cameroon, studies report a concerning underutilisation of HIS. While there is consensus in the literature that a well-developed and implemented Health information system yields more efficient results for hospitals (Li et al., 2022), more studies should focus on the effectiveness of health systems on patient care. Given that challenges are hindering the effective use of HIS, such as cost, infrastructure, technical know-how, low acceptance rate, and managerial ineffectiveness, there is a need to develop some guidelines that can help to improve patient care and ensure health facilities utilise health information systems more effectively.

The study aim explored the adoption of Health Information Systems in private hospitals in Sub-Saharan Africa, using a case study of Polyclinic IDIMED Douala Cameroon. The study explored some of the existing barriers to the use of HIS to improve and manage patient

care. This paper addresses the following research questions.

1. How does HIS utilisation help provide patient care at Polyclinic Idimed?
2. What are the key challenges and opportunities faced by Polyclinic Idimed in the utilisation of HIS in the provision of patient care?
3. What incentives are needed to be employed for a boost in HIS acceptance to support improved patient care, which promotes organisational performance?

2. LITERATURE REVIEW

2.1. Overview of health information systems

Health information systems (HIS) can be understood as the technology-driven mechanism helping to make the procedure of sharing protected health information indefectible between providers and organisations. Malik, Kazi, and Hussain (2021) states that HISs'' are powerful tools for guiding patient safety and effective health outcomes. Modern HIS facilitates an inclusive and specialised integrated framework to manage the responsibilities in the healthcare mechanism. These include a decision support system in financial, managerial, clinical, and administrative functions (Khalifa and Alswailem, 2015). Relevant and credible data provides the ground for better decision-making throughout all the sections of the healthcare system. According to Black et al. (2011), the utilisation of these health information systems in hospitals can perform a significant function in reducing medical errors. HIS has become very important for improving healthcare in a patient-centric way, particularly for chronic diseases. Health information systems are also applicable to integrated care. This is so because, in integrated care, it is vital to facilitate relevant information within a single institution and the domain where they are necessary (Winter et al., 2010). These involve nursing centres, centres of medical practices, rehabilitation centres, and the homes of the patients.

Abouelmehdi et al. (2018) argue that the increase in technology and technology adoption in executing patient services has led to increased data in the health information system. According to previous research, many healthcare organisations use technology to store electronic health records, use health informatics, and introduce telemedicine and telehealth, all of which have increased health data while also reducing the risk of health information being exposed to unauthorised individuals (Reegu et al., 2021; Dumortier, and Verhenneman, 2012; Fernández-Alemán et al., 2013). Electronic health records (EHRs), practice management software, master patient index (MPI), pharmacy management systems, patient portals, and clinical decision support (CDS) are some examples of health information systems utilised in the modern world.

2.2. Theoretical framework

The theoretical framework that will support this study will be the Technological Adoption Model (TAM). TAM elucidates the factors influencing customers' decisions on how and when to use new technology. TAM can be used to forecast customer satisfaction, improve customer service, and improve service quality (Allen, 2020). The "Technological Adoption Model" is a model that measures the intention of an individual behind the adoption and use of new technology. The adoption of the latest technologies varies with age, and it is found that the younger generation takes more interest in new-age technologies compared to the older generation. Therefore, this model identifies two factors - "perceived ease of use" and "perceived usefulness"- influencing an individual's attitude towards adopting new technology.

2.3. Applicability of TAM in Health Information System

The present time can be considered an era of technological advancement, and the demand for high-speed data and advanced technologies is skyrocketing. The "Technological Adoption Model'' provides a valuable framework that measures consumers' attitudes toward adopting new technologies (Allen, 2020). "Health Information System '' is a technology-driven system that collects, manages, stores, and shares the electronic health data of a specific patient to provide sufficient security to the health-related confidential data of a patient. Apart from ensuring data security, this system also aids in improving patient outcomes, decision-making, and policymaking for hospitals (Brook, 2022). The health information system includes multiple technologies like a patient portal, clinical decision support, electronic medical or health record system, remote patient monitoring, and others. This system can be highly beneficial to private hospitals.

However, the adoption of the mentioned system largely depends on the attitude of the hospitals regarding implementing the mentioned new age technology. TAM possesses two kinds of variables - independent and dependent. The independent variables of "TAM" are - "PEOU", "PU", and "Subjective Norm". "PEOU" or "perceived ease of use" represents the degree of user expectation for a technology to be free from too much effort. "PU" or "perceived usefulness" means a user's probability that technology can significantly improve job performance. "SN" or "Subjective Norm" reflects the social pressure faced by a person to adopt a target behaviour (Li, Qi and Shu, 2008). The dependent variables of "TAM" are - "Attitude towards Using" (AT), "Behavioural Intentional Use" (BI), and "actual system use". "AT" is the feeling of a potential user regarding a technology. "BI" represents the user's likes and dislikes regarding the technology.

The final behaviour of the user is characterised by "actual system use". A technology that does not require much effort put in by the user can generate an optimistic sense,

and the user might think that their job performance can get notably improved using that technology. Therefore, "PEOU" and "PU" affect each other. As this study will be based on an "individualistic culture", "SN" cannot be considered a significant variable. Otherwise, the social pressure of being competitive and technologically advanced can make this variable important and affect the other two independent variables. The dependent variables of "TAM" also influence each other. The perception of a technology by a user (AT) leads to the determination of the user's liked and disliked features (BI), thereby leading to either actual adoption or use of the technology or its rejection.

The role of Electronic Health Records (EHRs) in patient care. The literature suggests that electronic health record systems can improve the quality of health services primarily through the availability of health information (Gesulga et al., 2017). However, it is of concern that implementing EHR systems in healthcare facilities has been met with an alarming rate of failure (Kruse et al., 2018; Topaz et al., 2016). Previous studies have identified different barriers to implementing electronic health records (Graber et al., 2019). The barriers identified were categorised into the information systems resources. Studies suggest that people resources (user resistance and lack of skills) and procedure resource (concern for return on investment and lack of administrative and policy support) are the primary barriers to overcome (Mason et al., 2017).

Others have alluded to challenges in access to digital technologies, skills and experience, and preferences for using web-based and other digital technologies (Yang et al., 2017). For instance, Gordon and Hornbrook (2018) assessed the extent to which digital divides by race/ethnicity and age group might affect the ability of a large percentage of seniors, especially those in vulnerable groups, to engage with electronic health information and advice modalities (eHIA) and mobile health (mHealth) monitoring tools. They found that older seniors and black, Latino, and Filipino seniors had less access to digital tools, less experience performing a variety of online tasks, and were less likely to believe that they would be capable of going online for health information and advice compared to younger and white non-Hispanic seniors EHRs, according to Bujnowska-Fedak and Wysoczaski (2020), give standard access to a patient's medical report/data in a single system that is accessible to both patients and medical practitioners.

Xiao et al. (2021) argued that EHRs are accurate health reports of patients preserved by healthcare professionals that can be digitised, shared across multiple health organisations and platforms accountable for effective patient care, and accessed at any time and from any location. Furthermore, Ammenwerth et al. (2021) asserted that an EHR, which a healthcare provider hosts, delivers real-time medical information on a patient across several platforms and is accessible whenever needed. Electronic health records (EHRs), according to Habibzadeh

et al. (2019), including test results, allergies, prescriptions, and insurance information.

3. THE RESEARCH CONTEXT AND CASE ORGANISATION

Cameroon is one of the African nations experiencing a crisis in human resources for health. The World Health Organization (WHO) has classed Cameroon as having a critical shortage of health staff. Cameroon's efforts in strengthening human resources for health need to be improved by this (Kingue et al., 2013). For example, Tandi et al. (2015) analysed the health workforce's adequacy, evenness of distribution, and problems in Cameroon's several areas. It was discovered that some locations had more physicians (per person) than others, resulting in worse health results across the board. For example, 70 per cent of regions had a health personnel-to-population ratio of less than 1.5, signifying a severe lack of health workers. The migration of 232 physicians and 205 nurses from the public sector was attributed to poor working and living conditions and limited professional advancement prospects.

This has led to the growth of Private ownership of hospitals which is mainly return-driven or mission-driven, and unlike public hospitals, they are not operated by public entities or the state (Kruse et al., 2018). Private hospitals are supported and sustained by individuals who will not risk losing their reputation in the healthcare sector. Davalbhakta et al. (2020), contend that healthcare professionals working in the private sector are the best and most responsive to offer better insights into the functional access areas of healthcare.

The research site is Polyclinic Idimed, a privately-owned clinic situated in the economic capital of Cameroon, Douala. Polyclinic Idimed is a diversified health establishment established in 1997, making it 23 years of practice (Polycliniqueidimed.com, 2024). The clinic is well known in an urban and highly populated part of Cameroon because of its creativity, competency, multidiscipline and advanced technological platform. Operating in a city of almost 4 million inhabitants, Polyclinic attracts many patients (Douala, Cameroon Population, 2022). Additionally, it's listed among the top 3 private hospitals in Douala (Hospitals in Douala, Cameroon, 2022).

A polyclinic is any healthcare establishment that provides general and specialised health services to outpatients (Finch, 2008). Polyclinic Idimed health practitioners offer diversified services to their patients, some of which include paediatrics, cardiology, physiotherapy, ophthalmologist, radiology, neonatology, general surgery, dialysis, dental surgery, otolaryngology and otolaryngologist, obstetrics, and gynaecology (Polycliniqueidimed.com, 2024).

4. METHODOLOGY

This research aimed to explore the phenomenon from the perspective of employees, which required an approach that delves deeper into the thoughts and feelings of the study participants. This choice was also inspired by the fact that interpretivism places a premium on experience and relationships, resulting in more in-depth outcomes that reflect reality accurately (Matta, 2022). Data was gathered through discussions with participants about their experiences and ideas on how HIS has helped them provide better services and whether they were using it effectively. Interpretivism was more practical to fulfil study aim as employees spoke through interviews about their personal experiences, providing unique and detailed information to the research on assessing the relevance of HIS on-patient care at the polyclinic. Through these interviews, the researchers could understand employees' different views regarding using HIS.

This research was exploratory in nature as such the study was able to dive deeper into the issues and apply findings to health practitioners' experiences with HIS. According to De Langhe and Schliesser, (2017), explorative research is practical when the aim is to clarify one's understanding of a specific problem. -

For this study, the sample consisted of 13 one on one interviews and 2 focus groups. The first focus group was conducted with the finance department (3 participants), whilst the second focus group focused on the nursing department (4 participants). In total, 20 employees from Polyclinic Idimed Douala shared their insights. Participants were selected using a convenience sampling approach and purposive sampling. These were drawn from different departments of the polyclinic at different levels. The focus group participants were also selected from different departments of the polyclinic. The participants were chosen according to their roles in the Clinic and department.

Content analysis was used to complete the first stage of data analysis. The intention was to see the pattern in the text, and this was also used as a source of the open coding process. Thematic analysis was used to analyse the interviews, which were recorded, transcribed, coded, and analysed.
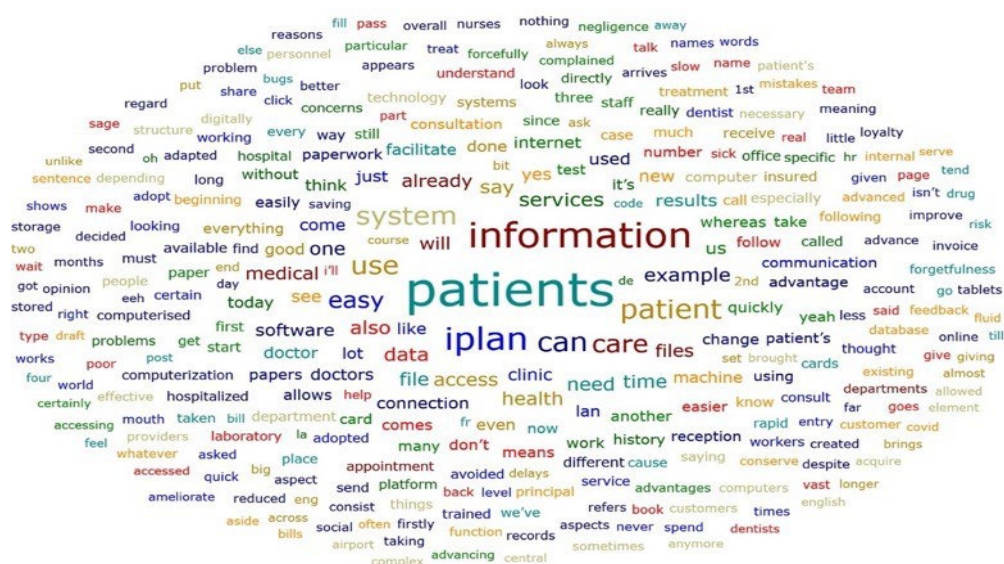
The researchers used the word cloud tool to visualise the text pattern, as illustrated in figure 1.

Yet, Polyclinic Idimed is one of the few hospitals using innovative technologies and offering modern services to patients in Cameroon. Nonetheless, the fact that these technologies still need to be fully utilised hinders them from benefiting from all the positive contributions of technological innovations, such as the health information system. Yet, Polyclinic Idimed has opportunities to improve patient care, reduce costs, and increase profitability.

Polyclinic is one of the polyclinics in Douala that has adopted HIS to help offer advanced patient care but fail to utilise it effectively. According to (Nasseh, Fosse, and Vujicic, 2022), an effective HIS will improve patient care in many ways, some of which include electronic patients' data, reduce costs associated with errors and limit the number of mistakes made due to lack of patients record.

Hence, the study fills a gap in the existing literature and develops guidelines that can be used to help implement HIS more effectively in a developing country like Cameroon. Though much has been written about HIS, there needs to be more focus on the importance of effective HIS on-patient care.

Figure 1. | Word cloud

This helped to focus the researcher's attention on the main text. Here, the researcher explored more the context in which this text was used to extract meanings. The word cloud was also used as a source for open coding. The goal

was to find the most used words throughout all the transcripts. This aided in creating a word frequency and calculating the word count in percentage terms. This was required to see the dataset's patterns. The word cloud analysis yielded 1739 tokens with a token ratio of 0.407. The token indicates how many words are used, and the ratio demonstrates the variation in word choice. The greater the balance, the greater the variation in word choice.

Table 1 | List of codes, sub-themes and main themes

Codes	Sub-Themes	Main Themes
• Information • Data • Test results • Patient's file	Patients' information	**Technological innovations and the Management of Patient information**
• Computerised data • Digital record • Tracked records • Electronic clinical documentation • Data base storage	Electronic health record	
• Changing business environment • New trends of doing things • Modernisation	Technological innovation	
• Diversified services • Different department	Multiple services	**HIS and operational efficiencies**
• Easy access to medical files • Time saving • Quicker services • Reduced paperwork • Easy handover shift • Advanced patients follow up • Easily tracked medical records • Access to patient's history	Effective patients care	
• Difficulties in accessing patient's care • Paperwork • Forgotten data • Mistakes • Negligence • Unaccountability	Ineffective patient care	**The traditional operational systems**
• Change resistance • User conflict • User unwillingness • Lack of technical knowledge	**Resistance to change**	**Challenges of HIS in the provision of patient care**

5. RESEARCH FINDINGS AND DISCUSSION

5.1. Technological innovations and the Management of Patient information

The literature suggests that technological innovations enable a transformation in the delivery of care (Coughlin et al., 2006). It is also said that technological innovations help to put patients at the centre of care systems that engage and empower them and their families (Hollis et al., 2015). This is achieved by connecting patients to caregivers and personalising services in response to patients' unique needs, preferences, and values (Pal et al., 2021). Technological innovations help to strengthen an understaffed, under-resourced health system (Greenhalgh et al., 2017). Of interest to this study was the role of technological innovations in managing patient information.

The participants shared those operational activities at the clinic had improved because of the health management system. This view is reinforced by the extract below:

Firstly, it makes things more modern and the saving system because with IPLAN, I know there is a system to save and conserve information (Participant 14 - Nursing department).

We learn that health information systems "make things more modern". This is contrasted with a traditional design that is not modernised. There is also a shared understanding that the updated system helps "to save and conserve information". More importantly, there was a shared understanding that the health information system "makes work quicker". We learn that technological innovations must be adapted to ensure compatibility with the required working practices. For instance, one participant had this to say:

Using a HIS can simply be a HIS with long procedures which doesn't speed up work. To make a HIS effective it will be necessary that its use be shortened. Because when the software designer came, we asked him to shorten the system because we get a lot of patients (Participant - 7 Receptionist 1).

Therefore, there is a need to embrace technological innovations within health institutions to improve working practices. Innovation must be adopted only if it contributes value to the organization. By saying, "when

the software designer came, we asked him to shorten the system because we get a lot of patients", the participant is drawing attention to the need for managers to think of their organisational contexts and adapt the health information system.

The literature suggests that electronic health records have the potential to transform healthcare and clinical research (Coughlin et al., 2006; Wali et al., 2020). More recently, electronic health records have been used to support public health responses to the COVID-19 pandemic (Madhavan et al., 2021; Wang et al., 2021). However, there are concerns about the security and privacy of electronic health records (Keshta and Odeh, 2021).

Whilst the benefits outlined above accrue to managing patient information, there are concerns when there is poor internet connectivity. There are also concerns over the safety of patient information. Hence, there is a need for a framework to ensure patient information safe. Further, participants fail to view electronic records from a strategic perspective, such as transforming healthcare and clinical research.

Studies have found that whilst patients are generally willing to share their information with health professionals, they are increasingly unwilling to distribute it to other stakeholders, such as administrators, researchers, or government departments (Whiddett et al., 2006; Saracino et al., 2021). Scholars have also found that patients are sometimes unwilling to share their information because it is of a personal nature (Jones et al., 2014; Saracino et al., 2021). The findings reveal this information in the form of individual files containing demographic information, contact details, address, medical test results, and any relevant personal data. With the increasing use of electronic records, there is a growing practice of sharing this information within the same medical institution or across different medical procedures. This information is often viewed by administrators, researchers, or policymakers. It has always been assumed that the patient's health information is available at the click of a button in a digitised health system.

5.2. HIS and Operational Efficiencies

Previous studies suggest that technological innovations in the health system help to enhance operational efficiencies (Aceto, Persico, and Pescapé, 2018). Others contend that a Health Information System improves and enhances the quality, data availability and administrative effectiveness of people's health (Torkudzor, Agbemabiese, and Amponsah, 2020). Such results were drawn from health contexts that are stable, well-resourced, and with uninterrupted internet connectivity. On the contrary, the findings of this study tell a story of operational inefficiencies.

The results reveal how participants failed to use the health information system because of poor internet connectivity and disruptions to the flow of work that emerged thereof. For instance, participants reported

challenges related to storing and retrieving information when there is no "connection", as illustrated by the extract below:

It's easy when you have the connection. Any user has his or her section to fill depending on their department and what they need from IPLAN (Participant 13- IT Department).

If "it's easy when you have the connection, " what happens when there is no connection? That means there are times when it is not "easy" to retrieve data because of poor internet connectivity. Whilst the "IPLAN" is easy to use, it is often affected by poor internet connectivity. Yet, the literature continues to paint a picture of efficiencies within health information systems (Bevans et al., 2014; Bishop et al., 2015; Rahunathan et al., 2018; Abbasi et al., 2020), and much to the neglect of daily experiences of staff in other health institutions, such as those in a developing country like Cameroon. This requires rethinking our understanding of the health information systems and developing appropriate health strategies relevant to the context of clinics in emerging economies.

Whilst the "IPLAN" helps to undertake multiple services, it emerged that it was less useful in other departments. For instance, staff from the nursing department reported that they use another health information system, as illustrated by the extract below:

I particularly use the LAN more…So, the LAN consist of; firstly, the information here are central this is to say if a colleague has information to share, what we do is the LAN regroups all the services in the enterprise. This means if there is any information to pass across, we don't forcefully have to pass it through mouth to mouth since we all with work post are connected in the LAN, we share the information thought the LAN and we can talk quickly especially adverse situations (Participant 14 - Nursing department).

By saying that "I particularly use the LAN more", the participant is drawing our attention to an awareness of another system, but the "LAN" is more suitable for the tasks that they do in the nursing department. Here, we learn that the clinic uses the "LAN" and the "IPLAN". An issue that arises is consistency and accessibility. It is unclear whether or not staff have access permissions to both systems.

The findings reveal that effective patient care can be achieved by appropriately using the "IPLAN" and "LAN". However, using the health information system requires training. Here, the training helps the employees know how the system works. The intention is to provide effective patient care. If one does not know "how it works, " they will find it challenging to use the health information system and provide effective patient care. This is illustrated by the extract below:

For the LAN from what I know it is easy to use the IPLAN that employees still need training…IPLAN still need to be trained to workers especially new ones coming. It not

everywhere that uses IPLAN system so when they are being recruited here, we have to trained them on how it works (Participant 14 -Nursing department).

Therefore, effective patient care depends on one's knowledge and ability to use the health information system effectively. In this sense, adequate training must be viewed as an inseparable part of the health information system because this is also an inseparable part of effective patient care. Understanding the interrelation between these variables is of utmost importance in developing and implementing effective management strategies in health institutions. The findings also reveal that training is needed when introducing a health information system. However, there is an acknowledgement of some challenges as user unwillingness, resistance to change, and lack of training. This has adverse effects on patient care. Therefore, gaining staff acceptance of the new system is crucial. This can be achieved through training, meetings, discussions, forums, and employee engagement.

5.3. The Traditional Operational Systems

Traditional systems in medical care have often been discussed within conventional medicines (Kasilo et al., 2019; Zhang et al., 2019; World Health Organization, 2019), focusing on integrating traditional and contemporary drugs within the healthcare system. This study unveils the importance of integrating conventional operating systems, manual systems, and digitised modern health systems. The digitised health information system is contrasted with traditional operating systems. Participants revealed that "everything used to be done by hand", and the "patient's data was written on sheets and manually". This is the traditional system within the context of this research. Though this system was slow and time-consuming, it never stopped because of poor internet connectivity or power outages, as with the "IPLAN" at this clinic. Participants demonstrated a deep understanding of the traditional or manual operating system. The manual system is contrasted with the computerised system to amplify the benefits of the health information system.

Thus, the traditional system was associated with difficulty, inefficiencies, and inaccuracies. For instance, participants shared that the old system was inherent with inefficiencies, as illustrated when a participant says, "reduce paperwork because when computerisation comes in paperwork reduces". This is interpreted as much waste inherent in the old system that relied on paperwork, whilst "IPLAN" is a paperless system.

5.4. Challenges of HIS in the provision of patient care

The literature suggests that implementing health information technologies is difficult with Sligo et al., (2017) highlighting a range of interrelated technical, social, and organisational factors as impediments to a health information system in the provision of patient care. For instance, Cresswell and Sheikh (2013) in a systematic review on organisational issues surrounding health information technology implementations found out there was a need to develop a contextually informed framework that would inform what counts as best practice guidelines that is contextually informed.

The data also reveal concerns about inconsistencies in what the system does, compared to what is known theoretically. For instance, a participant had this to say:

They told us at the beginning that we could do everything on IPLAN including slips. But apparently for hospitalisation we cannot do it on IPLAN. Also, with figures and percentages, we are unable to do it with IPLAN (Participant 2 - Finance Department).

This is a challenge in the provision of patient care. Here, there is an opportunity for training to be provided for staff, and to customise the system to the organisation's requirements. However, this is cause for concern because nothing has been done to resolve this issue. This means that the health information system is not performing according to expectations. The literature suggests that many promising technological innovations in health and social care are characterised by non-adoption or abandonment by both individuals and organisations (Greenhalgh et al., 2017).

5.5. Opportunities in the utilisation of HIS

A common theme in the findings is opportunities at the clinic because of the health information system. For instance, there is a common understanding that patient satisfaction, technological acceptance, and system amelioration have improved, thereby preventing further opportunities in utilising the health information system.

The findings revealed that the "IPLAN does not allow us to record the patient's progress". Whilst this is a limitation of the "IPLAN", it must also be viewed as an opportunity for improvements in the system. The findings also reveal that the "IPLAN" is effective in other clinic departments and does not yield the required results in the dental department. This inconsistency indicates that there are opportunities for improvement and the effective utilisation of the health information system.

Previous studies have found that adopting new technologies in health care depends on individual opinions of the factors relating to them (Safi, Thiessen, and Schmailzl, 2018). Their study reveal that some medical professionals believed that technology would interfere with their ability to make independent diagnoses and their relationships with patients. In contrast, other medical staff welcomed technology because it gave them more opportunities to interact with patients and their careers. Consistent with the literature, it was found that the change process takes time and that individuals accept change at different rates. There is a shared understanding that the health information system has helped to improve services provided to patients, as illustrated by the extract below:

Overall, it saves us from paperwork. Secondly, it allows us to receive the patients quickly, it also allows the doctor to treat the sick quickly and patients are satisfied (Participant - 7 Receptionist 1).

In the old manual system, there was a lot of paperwork. There was much waste. This is contrasted with the health information system that "saves" a lot of "paperwork". In the old manual system, patients were received slowly. This is contrasted by the health information system that allows patients to receive "quickly". Also, the old manual system was characterised by treating "the sick" slowly, whilst the health information system helps to "treat the sick quickly". This indicates transforming from a worse-off operating position to a much better operational system. This transformation culminates in an improved healthcare system and "satisfied" patients.

5.6. Revisiting the TAM framework

The TAM model was developed with the understanding of technology adoption within the context of western society and thereby lacks the contextual experience of technology adoption within emerging economies such as Cameroon. Furthermore, there are cultural variations between countries, which in the TAM model were demoted to a category of secondary theoretical relevance. Individual, organisational, and national cultures all impact technology adoption, as we all know. Even though scholars have used the TAM model in various nations, including Cameroon, there is still a scarcity of qualitative studies that add to our understanding of technology adoption in this paradigm.

Here, cultural variations are essential to understand because they affect technology adoption practices. For instance, the literacy rates in Cameroon are not the same as those in the UK or the USA. Hence, adoption practices of technology may be affected by this. Further, in Cameron, English is often a second or third language, yet learning the technology adoption model and new technologies are usually conducted in English. Had this been shown in local Cameroonian languages, different results may have been observed. The study reveals challenges with internet connectivity and IT infrastructure in Cameroon, a thing often unheard of in many western countries where the TAM model originated. These challenges affect the adoption of technology. Hence, the conceptualisation of TAM with only westernised understandings may be problematic because of cultural and resource variations.

6. CONCLUSION

This research found out that for the TAM framework to be implemented effectively, it must be nested within a socio-cultural context. It can be argued that the individual health professional is located at the heart of the socio-cultural context. Their ages, gender, job roles, working experiences, families, acquaintances, educational levels, and personal values affect their perceptions of the health information system. The organisational socio-cultural context includes individual interactions within the work environment. Here, it is argued that health professionals display attitudes towards HIS informed by moral generation within the parameters of recognised cultural and business norms. This behaviour is often scripted in organisational policies, missions, values, and strategic frameworks. The decisions are usually taken on behalf of health professionals. Yet, these internal stakeholders are essential to ensure adequate health information system implementation. Thus, there is a need to use the socio-cultural lens when discussing the usefulness of HIS, attitudes towards HIS and technology, ease of use, and perceptions of HIS. The national cultural context includes the rate of internet penetration in Cameroon, internet infrastructure, literacy rates, educational systems, government policies, health policies, and resources available to help health institutions execute national health strategies. Here, it is argued that uncontrollable variables within the business environment inform the policies formulated by organisations. Hence, the national strategy for ICT within Cameroon and resourcing of such a strategy that thus affects the usefulness of HIS, attitudes towards HIS and technology, ease of use of HIS, and perceptions of HIS.

Unlike the traditional TAM model, the proposed model offers practicality. TAM critiques as a "theory" include disputed heuristic value, limited descriptive and foretelling capabilities, criticism and a lack of practical utility (Ajibade, 2018).

Perceived ease of use is unlikely to become a defining factor of attitude and intention to use, according to studies conducted by (Bouwman and Van De Wijngaert, 2009). Perceived ease of use does not impact the adoption of online multimedia technologies for Malaysian small and medium-sized businesses (Okafor, Nico, and Azman, 2016).

The second constraint of TAM is that due to diverse subjective elements such as societal values and standards, individual traits, and personality attributes, the underpinnings of behaviour cannot be measured reliably in an experimental study. Even if the concept is genuine in principle or for individual use of innovation, it may not be trustworthy or exact in a working context.

6.1. Theoretical Contributions

Theoretically, the study proposes that individual, organisational and national cultures inform technology adoption. This locates the understanding of the TAM model within the rich and messy context of the individual, corporate, and national cultures. But individual differences such as values, norms, behaviours, and attitudes are often embedded at the heart of the technology adoption process. Hence, the study's findings contribute to the theoretical understanding of the TAM model when nested within individual, organisational, and national cultures.

6.2. Recommendations

The findings of this study offer valuable insights to managers and health institutions in developing countries that adopt health information systems. The five managerial contributions are discussed below:

1. There must be more focused attention on technological innovations and patient information management. This can be enhanced by developing solutions that integrate digital and manual patient information records. This means that electronic health records must be combined with manual health records and that both documents are updated regularly.

2. Management must modernise medical equipment and electronic devices. This can help to enhance the adoption and utilisation of the health information system.

3. There is also a need to enhance the operational efficiencies of the health information system. Here, the health information system should be used to advance clinical research and improve working practices.

4. Traditional and contemporary operational practices must be integrated slowly. This entails involving staff in decision-making before introducing the health information system. This will help increase the acceptance rate of the health information system and give the team a sense of ownership. This will also help to inform decisions surrounding the relevance of the health information system in an environment riddled with poor internet connectivity, poor internet infrastructure, and limited resources.

5. The migration from traditional to modernised health information systems must be managed slowly and carefully. Within this, solutions must be developed to integrate the manual and digital strategy to help ensure continuity and consistency in times of power outages and loss of internet connectivity.

6.3. Limitations of the Research

The are some limitations that must be acknowledged. The data gathering resources for the study were also a limitation. The study was self-funded, and the authors had to use their funds to complete it. This influenced the sample size distribution due to the high cost of travel. To save money on travel expenses, the researchers, in this instance, had to choose a region with a large population.

6.4. Suggestions for Future Studies

Future studies can focus on health information systems in other parts of Cameroon and other developing countries. This will help to draw insights from different parts of Cameroon to make the results more generalisable. More research is required to determine the efficacy of the recommendations given by this study and the results that ensue. These studies can provide helpful information for the health information system's implementation. Future studies can also focus on different aspects of the research model proposed to operationalise the framework. This will also help deepen understanding of the contextual aspects of the TAM model and help managers develop strategies relevant to context of application.

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