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Examining the PoC System Implementation and Adoption: A FVM Perspective

IMRAN MUHAMMAD & NILMINI WICKRAMASINGHE

Abstract HIS implementation is complex and involves people issues as well as technological issues. The effect of sociotechnical issues such as macro level or external factors including political, social, economic, environmental infrastructure and technology, laws and regulations; meso level or organizational factors such as leadership, management style, policies, structure; and micro level or tactical factors such as information sharing, training and learning, technical staff or user behaviour, have been less widely studied. Yet, it is precisely these issues that separately or in combination derail numerous HIS implementations. To examine this dilemma, we proffer a unique application of the fit viability model (FVM) to facilitate a better understanding of key issues pertaining the implementation and adoption of a Point of Care (PoC) System at one of the not for profit private hospitals in Australia. This will help the decision makers in hospital to understand how the new system fits within the different departments and also is it a viable option to install such a new system. This study focuses on just two departments of the hospital; namely, food services and environment services. An exploratory single case qualitative study methodology is adopted. From such an analysis, it is possible to identify optimal aspects with the PoC solution and opportunities to add value.

Keywords: • Point of Care Systems • Fit-Viability Model • PoC • FVM •

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1 Introduction

Information technology is an important part of almost every industry in the developed world. Businesses are expanding their boundaries by using integrated and collaborative IT solutions. Due to an ever-increasing need for effective and efficient healthcare services and delivery, healthcare organisations are now trying to find integrated solutions for their business needs to automate their processes to gain a strategic advantage (Ives and Jarvenpaa 1991). In addition, the complex nature of healthcare services is compelling and forcing healthcare organizations to adopt best available technologies, but the problem here organizations are facing is that they need to adopt technologies according to their requirements and best fit having considered their environment, infrastructure, government regulations, and scope of their business, availability of funds and local culture and norms (Ignatiadis and Nandhakumar 2007). Healthcare organisations are inclusive organisations, involving different stakeholders, partners, customers and suppliers from different cultures and different systems; they need more sophisticated means of communication and interaction (Harris, Moran, & Moran, 2004). Since the last decade of the last century, we have witnessed a significant growth in the adoption rate of information technology and a big shift towards the deployment of Health Information Systems (HIS) (Muhammad et al 2014). Most countries have responded positively to the changing global market place and are reaping the strategic benefits by implementing HIS (Mukesh and Betsy 2009).

HIS implementation is a difficult and complex decision and system implementation is not limited to just installing software; ie, it is much more than a technology adoption. Rather, it involves people issues more than technological issues (Cresswell, Worth, & Sheikh, 2011). Research indicates that people issues are more to blame for the unsuccessful efforts of eHealth implementations (Mukesh and Betsy 2009). The effect of sociotechnical issues such as macro level or external factors including political, social, economic, environmental infrastructure and technology, laws and regulations; meso level or organizational factors such as leadership, management style, policies, structure; and micro level or tactical factors such as information sharing, training and learning, technical staff or user behavior have been less widely studied (Nguyen et al., 2015). Yet, it is precisely these issues that separately or in combination derail numerous HIS implementations (Nguyen et al., 2015). To examine this dilemma, we proffer a unique application of the fit viability model (FVM) (Liang, Huang, Yeh, & Lin, 2007) to facilitate a better understanding of key issues pertaining the implementation and adoption of a Point of Care (PoC)System at one of the not for profit private hospitals in Australia. In so doing, we answer the research question: “How can a FVM assist in unpacking the varied sociotechnical issues in the adoption and implementation of PoC system?”. This will help the decision makers in hospital to understand how the new system fits within the different departments and also is it a viable option to install such a new system. This study deals with just two departments of the hospitals namely, food services and environment services. An exploratory single case study methodology is adopted. From such an analysis, we believe it will be possible to identify optimal PoC solutions and opportunities to add value.

2 Literature Review

Many healthcare information systems have been implemented around the globe with mixed results, despite the claims that HIS can play a significant role in efficiency and effectiveness of healthcare service delivery (Muhammad et al 2014) The literature provides evidence of failed clinical systems and lack of adoption by users (DesRoches et al., 2008; Protti et al., 2009). Challenges and barriers to implementation and adoption of bedside PoC systems in hospital wards have been extensively debated (Brailer, 2005; Choi et al., 2004; Yao, Schmitz, & Warren, 2005; Nguyen et al., 2015). Researchers have divided these barriers into different categories ranging from environmental, social, technical and Organisational (André et al., 2008). These factors can play a very crucial role in the decision-making process of technology adoption (Huang & Palvia, 2001). In a healthcare service context, where organisations are now required to work as a networked framework, health information technology implementation and adoption would be a more complex and challenging endeavor because of the different business processes, the available infrastructure, compatibility issues, decision centres, authorization mechanisms and hierarchies, enterprise systems and data semantics (Avgerou, 2008; Liu et al., 2011; Trudel, 2010). IT implementations can cause serious disruptions in service deliveries and in result, at productivity and healthcare services are one of the very critical areas of services that cannot afford disruptions (Kralewski et al., 2010; Scott et al., 2005).

There are many organisational barriers to the implementation and the adoption of eHealth technologies, for example, poor governance, organisational culture and proper management of the change process that could harm the flow of transformation (Greenhalgh & Stones, 2010; Kennedy, 2011). These issues can aggravate the resistance to the change process and complicate the dissemination of the eHealth technology. Technological issues can also exacerbate the resistance to the adoption of health information technology (Muhammad et al 2014). The lack of infrastructure, and standards results in a fragmentation of healthcare information systems and this contributes to creating a very complex situation for coordination (Kennedy, 2011; Trudel, 2010). Pre-implementation and post-implementation vendor support is another key concern for organisations (Kennedy 2011; Liu et al. 2011). Lack of technical resources and experience with information technology implementation within healthcare settings are other problems faced by many (Trudel 2010; Liu et al. 2011; Kennedy 2011).

People issues, ranging from user acceptance (Trudel, 2010), perceived ease of use (Al-Azmi et al., 2009), lack of knowledge about the system (André et al., 2008; Liu et al., 2011), lack of training, lack of stakeholder consultation (Showell, 2011), lack of willingness to assimilate the technology in to daily routines and processes (Greenhalgh & Stones, 2010) , conflict between system and user embedded values (Greenhalgh & Stones, 2010), complex and complicated user interfaces (Yusof et al. 2007), conflict between physician activities and training schedules (André et al. 2008; Yusof et al. 2007;) and complications in patient-provider communications are some of the major concerns. Further, it is paramount that the systems are user centric and have a good fit with user values as well as existing healthcare systems (Liang, Huang, Yeh, & Lin, 2007).

2.1 Fit-Viability Model

As Tjan (2001) proposed fit viability dimensions for evaluating Internet initiative projects. Liang and Wei (2004), by taking these two dimensions and adding Task Technology Fit (TTF) theory, proposed a fit-viability model to study m-commerce applications. In their framework, viability measures the readiness of the organization for the technology adoption and implementation, and fit measures capabilities of the systems to optimally perform the required tasks. These two dimensions make a simple matrix with fit on horizontal and viability on vertical axis. By using the four corners of the matrix, organizations can make an informed decision for technology adoption and implementation.

2.2 Task-Technology Fit

The theoretical basis of the fit construct is derived from the Task-Technology Fit model which according to Goodhue (1995; 1998) argues that a fit between task characteristics and system features need to be high for the better performance and success and this will have effect on the decision-making process of an organization. Research (Madapusi 2008; Soh et al. 2000) has indicated that if a system is more aligned with the requirements of the users there are greater chances of system success which leads to better performance. It means that if the features offered by the system fit with the task requirements the users will be more incline to use it.

2.3 Viability

Viability refers to the degree of impact of environment and organizational factors on a system adoption and implementation decision. These factors at the macro level include political and social, economic, environmental as well as infrastructure/technology factors. At the organizational level literature has proposed many factors at the strategic and tactical levels (Umble et al., 2003). These factors include leadership, management style, polices, information sharing, training and learning, technical staff, and user behaviour. Taking the example of PoC, economic and technological factors are crucial factors in HIS system implementations; and ignoring these factors could lead to unsuccessful projects. Management support, physical and IT infrastructure create stronger desire of system implementation and innovation adoption, that positively impact viability of the system.

3 Research Framwork

The research framework shown in figure 1 illustrates is used to identify the key constructs and factors affecting PoC system implementations. The PoC is a patient bedside solution that can be accessed across the hospital by clinicians and also has a patient portal component. It is not an EMR (electronic medical record) but has many features and capabilities similar to an EMR. It also has a patient entertainment component. The PoC system was implemented into the not-for private tertiary hospital system (the chosen case

study) gradually starting in late 2015. Primary objectives for its implementation included to enhance the patient experience and provide value-based patient-centred care. The system has many modules of which this paper focuses on catering/food services and environmental services. Fit is measured by matching the requirements of the organization with the functionalities offered by the PoC system e.g. data format, operating procedures, and output format while viability is measured by assessing the impact of national and organizational factors on the adoption decision of the organization and individual user adoption.

Considering that the PoC has many similar factors to other e-health solutions such as political and sociotechnical factor identified by (Muhammad et al 2016) in evaluation of MyHealth record in Australia (the Australian national e-health solution) and smart card solution in Germany (the German national e-health solution), thus it is logical to use these factors as the basis of the model. This conceptual model serves to capture the important aspects of the barriers and facilitators for the prediction of the successful adoption and implementation of the PoC. The proposed model identifies a network of different actors interconnected to each other. It further illustrates that a central issue with the evaluation of IT based healthcare is influenced by the complexity of the evaluation objects and includes both social and technical considerations (Greenhalgh & Stones, 2010). For instance, the nature of the integration of healthcare information systems with the culture and business processes of healthcare organisations puts more emphasis on the evaluation methods and goes beyond the technology aspects of hardware and software, furthermore, external and internal environmental factors as well as an understanding of the diverse nature of system effects in the healthcare settings is required (Greenhalgh & Stones, 2010). This emphasis is on creating a better fit between human, contextual and technological factors for the successful implementation and adoption of health information systems (Yusof et al., 2008).

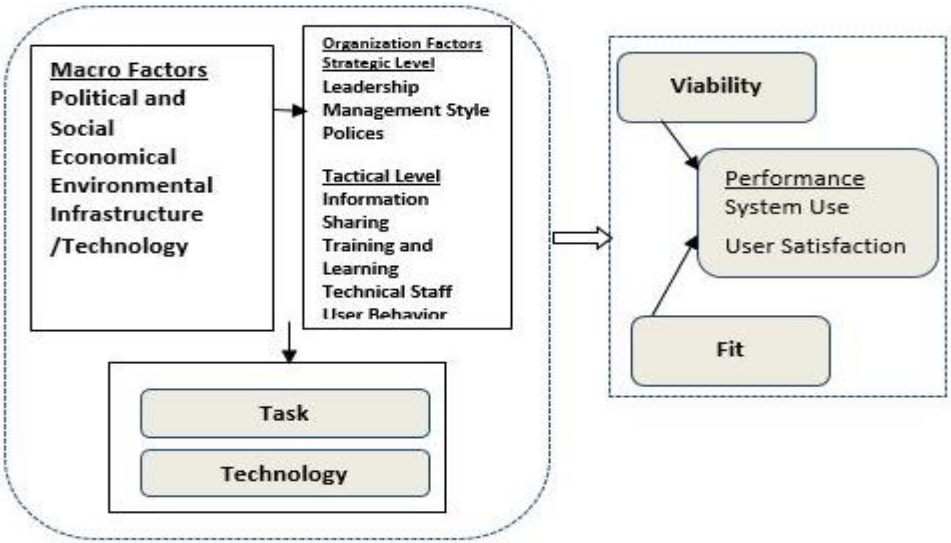

Figure 1: FVM

4 Methodology

Based on the criteria given by Yin (2010); the appropriate choice of methodology to test the use and usability of the proposed framework (figure 1) is a qualitative case study research because this is an exploratory study of a new phenomenon of bedside PoC information system's implementation. Further, we wish to explore how the PoC solution at different sites of the hospital can be implemented successfully and what are the factors that impact on the implementation and adoption of this HIS based intervention. Qualitative research is holistic, humanistic, and interactive, it can provide more support to focus on the study of a complex phenomenon of human and system interaction and relationship; as in our case multisite bedside PoC system implementations. Qualitative research can provide deeper understanding of the phenomenon as compared to quantitative study because of the exploratory nature of the study and focus which would not be on quantitative measures (Yin, 2010). For this study, several archival records and documents relating to the health information and communication technologies implementation and adoption in healthcare service delivery settings along with hospital and OneView reports and evaluations were critically analysed. These documents were of great value in developing an understanding of the need for a PoC system and factors important for the implementation and adoption of this system. This analysis assisted in developing the theoretical re-search framework and in planning the primary data collection strategies for the larger study. A priori themes were developed through a pilot study and then literature was analysed using thematic analysis and hermeneutic analysis (Boyatziz, 1998; Kvale, 1996), then we performed a gap analysis. The analysis led us towards the development of FVM for this study.

5 Analysis and Results

Data for this piolet study was collected using unstructured interview and analysis of archival material. As far as possible, the multiple stakeholder views (i.e.; Service providers, regulator, payer, Food and environment services, and hospital and patient perspectives) in healthcare were captured. Data analysis included standard qualitative techniques such as thematic analysis where a priori themes were derived from the components in the conceptual model. The case studies all exemplify various aspects of the proffered conceptual model in this way serving to validate the model and demonstrate its usefulness in unpacking critical aspects with HIS implementation.

5.1 The context before and after OneView PoC system

This section presents a process map for two departments of the hospital before and after the implementation of the OneView PoC system. It must be noted here that prior to the PoC system, there was another system known as Infotainment. This system had many problems concerning mainly to poor technical support, frequent hardware and software failures, smaller screens, and usability issues especially with the user interface and the biometrics registries. That systems really did not fit with in the hospital quality services environment thus the change was impending. This section will explain the process before and after OneView PoC system within two departments; namely Food Services and Environmental Services. These departments are chosen as they are fully transitioned to the new PoC system now.

5.1.1 The Context of Food Services

Prior to the current PoC system, the processes in the Food Services were facilitated using an application called Delegate. This application had been in use since the opening of Epworth Eastern and has been replaced by OneView PoC system. Hence, the old PoC system was not used by the staff from Food Services.

5.1.2 The Context of Food Services Prior to OneView PoC system

Managing patients' meal orders was handled by the Department of Food Services. The contact point was the Menu Monitors, who take the meal orders 24 hours prior to the actual delivery of meal. A computerized system called Delegate Prior to OneView PoC system was used for the order and delivery services. Delegate system was installed on a number of computers on wheels (mainly laptops). Taking orders and delivery meals to the patient includes discussing the options and personal preferences for the breakfast, lunch, and dinner for the next day. This process would usually consume nearly 70% of the Menu Monitor's work time with a rate of 14 patients per hour. That is 3-4 minute per patient. Patients can choose three full courses for the next day from a menu that changes every three years hospital wide. The gathered information about the meal preferences was then entered by the Menu Monitors into Delegate, and then spread sheets were printed off this system to circulate to kitchens. These sheets were then assigned to different chefs as

'Production Lists'. Throughout the day, three production lists were prepared, one in the morning (7:00 am), the second is after breakfast (10:00 am), and the third is at 3:30 PM for the evening as Figure 2 below illustrates.
Two main issues were found in this way of handling patients' meals. The first relates to the information collection, and the second issue about Delegate performance and functionality.

Although preparing the production lists was time consuming and required loads of time for the interaction between patients and menu monitors, still four types of information were not possible to capture using Delegate and the process around it. Those are:

I. **Late orders**: Meal orders for patients admitted after 8 pm during week days and after 7 pm during weekends were not attended. This group of patients did not had a choice of food for the first day of their admission because they could not see the menu monitors. Rather, they would have the default meal for the day.
II. **Food allergy for visited patients**: Delegate did not had any capability to record any food allergy patients may have. This piece of information normally comes from iPM. In many cases this information was then not passed on to the chefs, so they make meals without taking that into consideration.
III. **Discharged people**: Depending on the time patients are discharged, many cases reportedly happened where meal orders were made, but patients had been discharged. Again, this piece is coming from iPM, and not passed on to the Food Services staff at the right time.
IV. **People with changed diet codes**: As treatment plans progress, patients may change their diet codes, such as changing from 'not eating' to 'eating' and from 'soft' to 'hard' food. These changes were also managed by nurses using iPM, however, the co-operation between nurses and Food Services was not maintained at all times, which resulted in many cases meals were not made according to these changes.

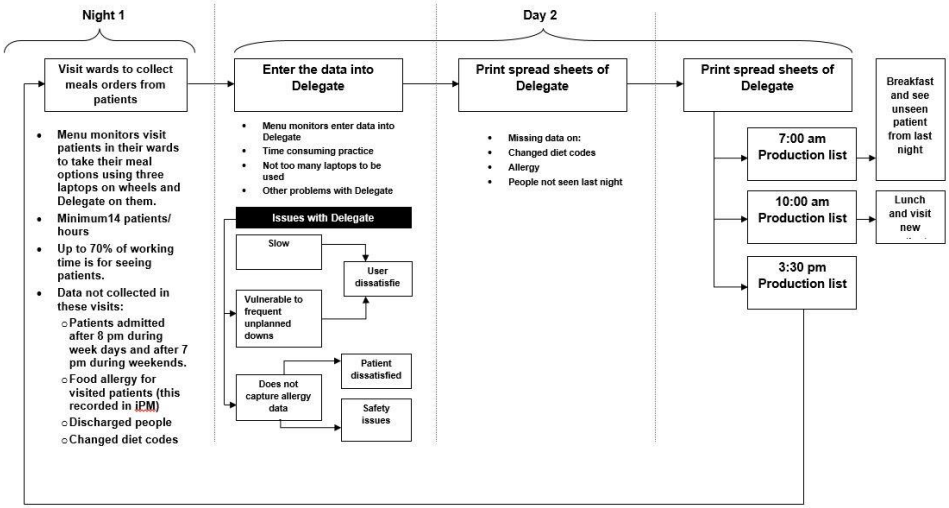

Figure 2: A Flow chart for ordering meals before PoC

These issues had direct and indirect impacts on the cost and quality of provided services as Table 1 below summarizes.

Table 1: Issues resulting from the conventional way to handle meal orders prior to OneView PoC system

Issue	Impact on Cost	Impact on quality
Late orders	None, as patients receive the default meal for the next day	Negative impact on patient satisfaction
Food allergy for visited patients	Wasted food, unplanned care for the resulting allergy which may result in implications on patients' insurance cover	Negative impact on patient satisfaction and safety as well as trust in the hospital
Discharged patient	Wasted food	More pressure on chefs
Patients with changed diet codes	Wasted food	Negative impact on patient satisfaction

Delegate has a number of issues as the interviewees from the Food Services agreed. These issues include:

I. It was perceived to be a slow system.
II. System was not really fit for the task.
III. Long term viability of the system was really doubtful even though infrastructure and management support were available.

IV. The system had many technical problems and fixing these problems took long times as described by this interviewee: "If there is some technical problems with Delegate this would take long time to fix. I mean when the system goes down it really goes down and takes a while to fix".

V. As mentioned before, Delegate did not have the capability to capture food allergy data, which forced the staff at the Food Services to look up these data from iPM. This was not possible all the time, which resulted in a number of cases where patients had food that they were allergic to, consequence this had negative impact on patient satisfaction and healthcare services and delivery of the hospital.

While some issues with Delegate had negative impacts on the users, thus they became dissatisfied about the system; but few problems were really serious problem with real consequences on patient's health and safety. Not only did it negatively affect patient satisfaction and experience, but it also represented a real risk factor and caused safety issues to the patients and the hospital at the same time.

5.1.3 The Context of Food Services After OneView PoC system

Using OneView PoC system, patients can place their orders of meals through their user interface. The arrival of this function to the PoC system has partially solved the issues faced by the conventional system; namely late patients (after 8 pm weekdays and after 7:00 pm weekends), allergy data, and patients with changed diet coeds. Late patients can order their favorite meals for the next day if they want to, they can state their allergy status through the admission form, and nurses can change patients' diet codes right from OneView PoC system.

Currently, no more than 10% of the patients are using the PoC system to order their meals. On asking on the reasons behind that, two main reasons were identified. The first is some issues with the user interface, especially with elderly patients, as patients need to scroll down to the bottom of the screen to reach the meal ordering function. During the scrolling down, a number of pop-ups will appear and may disrupt their endeavor: "We go up and introduce the system to them. When you go into the system at the minute, the way they implemented it, it is hard to use. You've got to scroll down to find the ordering".

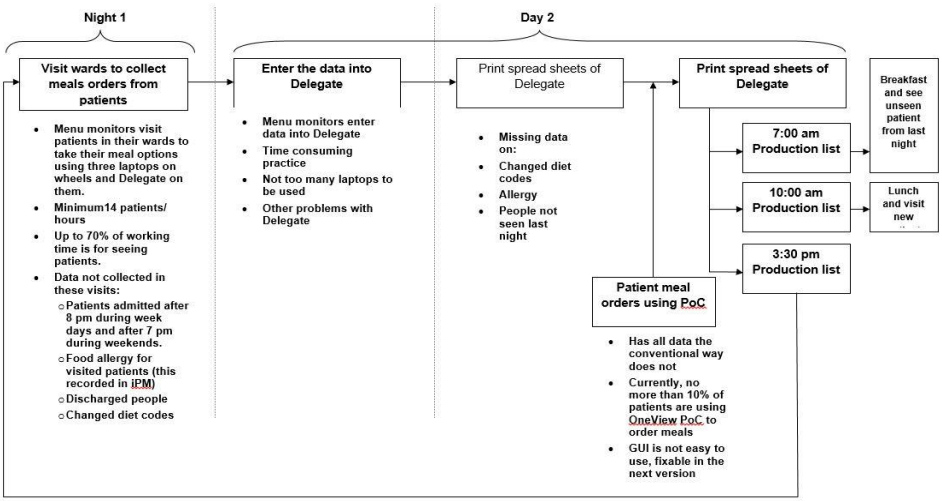

Figure 3: A Flow chart for ordering meals after PoC

The other reason relates to the conceptual resistance by some patients to rely on a 'machine' to order their meals, preferring human-human interaction more than human-machine interaction. This was agreed upon by both interviewees from the Food Services. As a result of being in a hybrid environment, i.e. a minority of patients are using the PoC system to order their meals, and the majority are still using conventional way to order their meals, Delegate now has colored dots to indicate the patients who used the PoC system to order their meals. Hence, the menu monitors do not need to visit them to organize their meals.

With the expected increase of the uptake of this function in the PoC system, more patients will adopt this function, and more time required to see patients by their menu monitors will be freed-up. This is expected to have positive impacts on the hospital and its patients. In addition, it is expected that there will be a significant saving regarding food wastage.

5.2 The Context of Environmental Services

The Environmental Services is a dedicated team whose two main responsibilities are 1) providing all types of cleaning (steam cleaning, buffer cleaning, advanced cleaning, curtains cleaning, etc.), and 2) patient transportation. In terms on human resources, the Environmental Services team comprises about 60 staff. Of this figure, about 40 works in cleaning, and the reminder work in patient transportation.

Unlike the Food Services, which had Delegate as a computerized system to facilitate food-related processes prior to the OneView PoC system, the operations of the Environmental Services at the hospital were mainly based on phone to phone and face to face communications. Introducing the OneView PoC system and integrating the Room Ready Module into it has made considerable change in the processes of this vital

department. The following is a summary of the process map of the Environmental Services at the hospital before and after OneView PoC system.

5.2.1 The Context of Environmental Services before OneView PoC system

The process of performing jobs by the Environmental Services before the PoC had three main steps. 1) Initiating the job by nurses and specific cleaners; 2) receiving job orders by the supervisors within the Environmental Services; and 3) assigning tasks to cleaners as Figure 4 depicts.

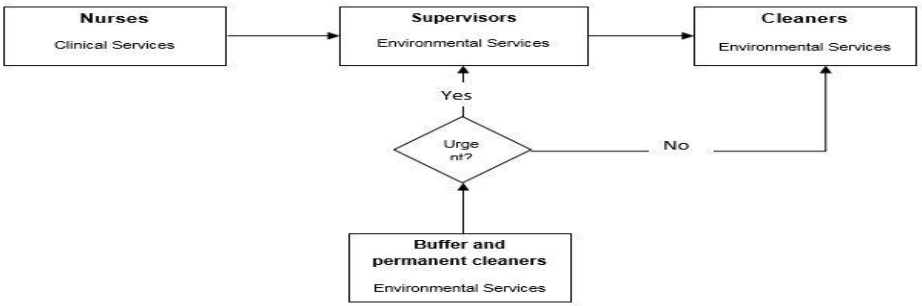

Figure 4: A map for the Environmental Services before OneView PoC

Nurses normally initiate job orders when needed. This includes preparing rooms before admitting new patients to these rooms, cleaning rooms after patients have been discharged, and as needed if a patient had an incident such as bleeding or vomiting. These job orders go to the supervisors from the Environmental Services using face to face or phone to phone communications tools. The supervisors in turn convey these orders to the cleaners across the hospitals using same communication means, i.e. phone and face to face. Apart from nurses, buffer cleaners and permanent cleaners can initiate job orders if need be. This normally happens when one of these cleaners realizes, while doing their jobs, there exist some curtains or carpet need to be cleaned, and they do not have the required equipment to do so. Once the need of a cleaner has been established, the path of this order in dependent upon its urgency. If the job was of a higher urgency, then these cleaners inform their supervisors either by phone calls or by hand-written notes. Then the supervisors assign the tasks to different cleaners on floor accordingly. If the job was not considered urgent by these cleaners, then they will wait till the next shift of cleaners has come to do the job based on hand written notes, which caused extended times to do specific jobs. The level of urgency was left to the cleaners to decide.

This system had caused many problems, which can be summarized as follows:

1. Over relaying on human factors: As can be seen, the whole processes of the Environmental Services team are centered on human communications and judgment. This resulted in many cases where jobs were not done or took longer time to be addressed. This is particularly acute in the cases where patients had

to wait outside their rooms while cleaning the room, which resulted in unsatisfied patients and nurses.

2. Lack of co-ordination in the multi levels of communications: Given that nurses, supervisors, and permanent and buffer cleaners could initiate job orders, cleaners in many cases were confused about their tasks and what tasks had higher priorities. This lack of coordination was due to adopting phone calls, hand-written notes, and face to face means.
3. Inability to address language barriers: Given that a considerable portion of the cleaners had language barriers, their understanding of their assigned tasks over the phone or hand-written notes was reportedly limited in many cases, which caused many jobs not done properly.
4. More effort by cleaners: As the job orders did not have enough information about their jobs (locations, level of urgency, and required equipment), the cleaners had to go to the site to manually collect all of this information and come back to their workplace to collect the right equipment for that specific job. This caused them to walk back and forth many times, which reduced their productivity and the quality of their jobs, and increased their fatigue.
5. Lack of accountability: As the majority of the needed jobs were verbally conveyed from one stakeholder to another, the possibility of creating accountability and tracking the performance of different units and individuals were almost impossible. This is especially acute in the case of cleaners with limited literacy, as well as the communications between nurses (Clinical Services) and the cleaners and their supervisors as Figure 4 depicts.

These issues had direct and indirect impacts on the cost and quality of provided services as Table 2 below summarizes

Table 1: Issues resulting from the conventional way to handle environmental services prior to PoC system

<table>
<tr><th>Problems</th><th colspan="2">Impact on Cost</th><th>Impact on Quality</th></tr>
<tr><td>Over relaying on Human Factors</td><td colspan="3" rowspan="3">Double work resulted in many cases, which implied extra cost and less quality</td></tr>
<tr><td>Lack of Co-ordination:</td></tr>
<tr><td>Multi levels of communications</td></tr>
<tr><td>Language barriers</td><td colspan="3">As many jobs needed to be repeated, double works resulted in many cases, which implied extra cost and less quality</td></tr>
<tr><td>More effort by cleaners</td><td colspan="2">Given the missing information on the nature of their tasks, cleaners had to survey the location of their jobs in person, which resulted in them walking for extended times/ distances.</td><td>Due to the unneeded increased workload, the quality of cleaning services was negatively affected</td></tr>
<tr><td>Lack of accountability</td><td colspan="3">Tracking the performance of individuals and different unit was almost impossible</td></tr>
</table>

5.2.2 The Context of Environmental Services after OneView PoC system

Introducing the OneView PoC system, particularly the Room Ready Module, has notably streamlined the cleaning related processes of the Environmental Services, while the other vital role of the Environmental Services; namely patient transportation, is still conducted using the conventional way, with a vision to integrate this function into the OneView PoC in later enhancements.

The Room Ready Module enables nurses, permanent cleaners, and buffer cleaners to log into the system and place cleaning orders with enough details about the job, its location, requirements and level of urgency. This information is then conveyed to the cleaners on floor as short text messages on their PoC phones. Based on the nature of the jobs, cleaners can choose the jobs of higher urgency, closer to their geographic location, and/ or achievable using their current equipment. This has resulted in saving cleaners' times and efforts, which in turn has shown faster responses to the cleaning needs initiated by different wards, units, and individuals. Not only has the Room Ready module enhanced quality and productively of cleaners, but it has also resulted in a simpler map of cleaning processes performed by the Environmental Services as Figure 5 depicts.

Figure 5: A map for the Environmental Services after OneView PoC

The initial findings from the interviews show that the use of OneView PoC system to support the cleaning processes at Epworth Eastern has addressed most of the problems faced by the conventional way to manage the cleaning needs for the hospital. Table 2 summarized these findings:

Table 2: The impact of Room Ready Module from the OneView PoC system

Problems	**How has OneView PoC addressed the problems**	**Impact of OneView PoC on**	
		Quality	**Cost**
Over relaying on Human Factors	This problem has been partially solved, as human still need to log in and place job orders. The existence of Room Ready though has increased the ability to place jobs and track them.	Positive M	Positive M
Lack of Co-ordination:	The introduction on Room Ready Module has eliminated one layer of communications in the process map of cleaning services. That is the supervisors, which has freed up their time, and has rebuilt their roles around coordinating different tasks and following up with different stakeholders.	Positive H	Positive M
Multi levels of communications			
Language barriers	As job orders come to cleaners in a form of short text messages on their PoC phones, this problem has been partially solved.	Positive L	Positive L
More effort by cleaners	As the jobs orders come with a relatively comprehensive set of information, cleaners don't need to go and assess the job before actually doing the job, which resulted less	Positive H	Positive M

	effort from them, and more tasks performed every day than before		
Lack of accountability	All jobs' orders are now documented and stored in the system. Hence, tracking different jobs and their progress and the responses from different stakeholders is always possible.	Positive H	Positive H

Legends: L: Low, M: Medium, H: High

The initial results suggested that the PoC system for food and environment services is fit for task and very much viable to implement. Almost all sites of hospital were ready for implementation. IT Infrastructure was fit for the purpose while physical infrastructure needs changes for one site. Environment was favorable, and project have full support from top management. Appropriate budget was allocated for the project. Our initial analysis suggest that the use of system will be depended on the fitness of the system for the tasks. Users were very positive in its very early stages of deployment. We contend that a large-scale study is prudent to further understand the capacities of implementation and use of this system for clinical services.

6 Conclusion

The purpose of this research paper is to conceptualize a framework to investigate the implementation and use viability of a bedside PoC health information and entertainment system for food and environment services for patients in private hospital wards, since we recognize that with e-innovations not only the technology solution is necessary but it is also critical to look at organizational and societal aspects concurrently especially in today's global business environment. ehealth system implementations comprise of technology as well as human involvement. In view of this, it is important to investigate the impact of political and social, economic, environmental and infrastructure/technology factors on the organizational decision making. We underscore the importance of studying the system viability and fit before making any decision about system adoption and deployment. Technology needs to have a good fit to perform the required tasks, only then can system viability and fit have positive effects on the organization's performance and that can be measured by system use and user satisfaction and thus ensure the full potential of a solution is realised.

The theoretical contribution of the paper is the use of Fit-viability model for the evaluation of health information technology (HIT) implementation in private hospital settings. This model has never been used of HIT implementations, thus we believe the model will present more informed lens for decision makers to understand HIT implementation. The practical implication of the Fit-Viability model presented in this paper can be realised by using the developed model to measure the fitness and viability of implementing health information technology in hospital settings. This should be able to envisage the possibility of success.

There are also limitations of this study First, the theoretical generalizability of the FVM needs critical testing in future studies. Second, the findings of this paper are based on just two segments of the hospital namely food services and environmental services, thus more extensive studies including more segments of hospital may be necessary.

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