

Exploratory Study to Understand the Phenomena of Adoption of Wireless Handheld Devices in the Australian Healthcare System

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ABSTRACT

According to an Australian department of health and aging (www.health.gov.au), adoption of new technologies is crucial in addressing health issues. Currently, wireless technology is used in Australian healthcare with limited scope addressing specific aspects of quality of service offered to various stakeholders. While prior studies agree that wireless applications have the potential to address the endemic problems of healthcare, very limited information can be found about the determinants of such applications. Therefore, there is a need to identify factors that assist in the adoption of wireless applications in healthcare and the factors acting as barriers for the uptake of wireless applications. In doing so, this study used focus group discussions and a survey method to accomplish the requirements of this study. The study was structured in two specific phases. The first phase of the study involved conducting focus group discussion sessions with selected healthcare professionals to explore their views and opinion regarding factors involved in the adoption of wireless handheld devices as applicable to the Australian healthcare environment. The second phase involved administering a survey instrument to generalize the findings of phase one for the wider community and to capture the views of the wider population. The initial outcomes of the study indicate that organizational readiness, technical readiness, clinical practice, social aspects as well as compatibility of new hardware with existing system playing a crucial role in the adoption of wireless handheld devices in the Australian healthcare systems.

Key Words: Wireless technology, healthcare, adoption factors, information systems

1. INTRODUCTION

The last three decades of investment in information and communication technology has had a dynamic effect on healthcare. Such an investment has resulted in increased productivity, high quality of services, and development of new processes. Despite this, the healthcare industry did not enjoy the flexibility as the industry was always operating under limited resources. Recently, the strategists, operators, decision makers, and other stakeholders have realized the potential of information communication technology (ICT), especially in wireless technology and see an opportunity to address some of the issues the healthcare sector is facing. It is suggested the ICT has the potential to address some of these issues such as quality of care, reduction in cost, shortages of human resources, reduction in errors, reduction in funding, and high satisfaction levels among customers and employees. For example, a patient registering in a hospital may be issued with electronically readable code and staff with wireless devices can enter critical information directly into the hospital network. Through wireless devices, a patient's body can be connected to various hospital equipment to record medical data such as blood pressure and heart function, and these aspects can be directly monitored, recorded, and analyzed by doctors internally and externally. Through wireless networks and handheld devices, doctors can order tests, prescribe medicines, and request other services directly from the patient's bed.

Wireless handheld devices can provide care and other associated activities, wherever, whenever, and at a competitive cost, at the point of care in a highly competitive environment (Sharma, 2007). At the same time, Australian healthcare providers are operating with limited resources, reduction in operating costs, and demands to redesign their workflow systems to accommodate the dynamic environment of the healthcare industry. Therefore, adoption and utilization of new technological developments, especially wireless handheld devices, can be critical for survival of healthcare services in Australia. As a result of the reduction in hardware/operating costs, functionality, and ability to transmit high speed secure data through wireless infrastructure, wireless handheld devices are able to address some of the concerns of Australian healthcare providers. This study will attempt to explore the determinants for the adoption of

wireless handheld devices for the Australian healthcare environment.

2. LITERATURE REVIEW

In healthcare literature, the concept of wireless technology is discussed by many studies (Wisnicki, 2002b, Dyer, 2003, Simpson, 2003, Sausser, 2003, Handy et al., 2002). For example, (Baker, Oh and Lee, 2008) provide details of how broadband technology, a component of wireless technology, can be used in healthcare. The discussion provided by (Wisnicki, 2002b) involves the high cost of setting up wireless technology in a healthcare setting, improvements to patient care using this technology and potential cost-effective quality of service to patients. [4] provides information on how to improve clinical quality using wireless technology, including challenges for maintaining security and privacy. [4](Wu and Wu, 2007) also discuss the concept of portable devices for data collection purposes by providing an argument on benefits that can be realized using these devices. (Simpson, 2003), while critiquing the nursing domain, stresses the need for the innovative use of IT to improve patient care. He points out that new wireless technologies can help address some of the chronic problems encountered, including saving nurses' time, skilled nursing care and home healthcare. (Dyer, 2003), on the other hand, provides details of how text messaging using wireless devices can be effectively used to remind patients of their appointments. He reports the idea behind a radically new system of managing patient care in conjunction with modern telecommunication applications using wireless devices to improve the quality of patient care. Common to all these studies is the use of emerging wireless applications in healthcare and potential benefits that can be achieved.

In terms of handheld adoption for healthcare, studies between 2000 and 2003 discussed various aspects of wireless technology in clinical domains. For example, the use of broadband (Wisnicki, 2002a), addressing the staffing crisis with intelligent solutions using agent and wireless technology (Davis, 2002, Kang et al., 2007), compliance with the rigorous regulatory framework (Wisnicki, 2002a), reduction in medication errors, the benefits that can be realized in such reduction as discussed by (Turisco, 2000), provision for greater flexibility and mobility of healthcare workers in performing their work as portrayed by (Athey and Stern, 2002), and effective management of the increasingly complex information challenges and improved access to information from anywhere at anytime as discussed by (Stuart and Bawany, 2001). Our review clearly identified that all these studies were only implying the potential of wireless technology and did not provide any empirical evidence (Gururajan et al., 2007, Gururajan, 2007, Hafeez-Baig, 2007). We hypothesize that the economic and cultural context has a significant bearing on rate of and approach to adoption of ICT. The healthcare environment is complex, sensitive and time critical and, hence, TAM could have behaved differently. However, this proposition needs testing.

While many other studies in the healthcare literature echo similar sentiments, none of these studies have examined the potential challenges of using wireless applications. It appears that almost all studies have taken this crucial aspect for granted and did not research, for example, the impact of factors such as compatibility, integration, support and training, configuration, and security issues. While some studies have indicated existing problems in collecting patient data and provided some theoretical solutions, these studies have seldom analyzed the changing nature of information systems using wireless applications. For instance, (Sausser, 2003) mentions the advantages of using mobile technology in collecting patient data, but does not provide an in-depth analysis of the strengths, weaknesses, their influences and how critical these factors are for successful implementation and usage of wireless technology.

To comprehend the issues related to data collection using wireless applications, information technology studies were also reviewed. The review indicated that this area (wireless technology) is not fully researched in information systems. For example, (Redman, 2002) states that wireless technology is in its infancy stage and warns of the potential pitfalls of IT providers rushing to implement the technology, and (Shah, 2001) warns of the slower speed of wireless networks compared with desktop computers and highlights the potential problems that could be encountered by healthcare. The relatively high costs to initially set up these wireless networks is mentioned by (Shroef, 1999). The lack of real time connectivity due to the mobility of the device and the problems associated with such mobility is highlighted by (Stevenson, 2001). The size of the screen and, hence, the problems that may be encountered in displaying data due to screen size while capturing data is stressed by (Toms, 2000). The problems that may be encountered due to the lack of provision for high quality graphic display on wireless devices is highlighted by (Atwal, 2001, Schaper and Pervan, 2007). (Bevan and Mittman, 2002) discusses the potential problems of capturing data using wireless devices due to the 'hard-to-see display' nature of these devices. It should be noted that the studies mentioned above warn of the problems that could be encountered while using wireless applications. However, there appears to be a general agreement that these wireless applications are growing in demand and, hence, these hardware related problems will disappear within a few years (Wu and Wu, 2007). The implication of this notion is that healthcare providers will accept these technologies due to the demand placed on the usage.

What can be realized from this review is that the bulk of the studies have paid attention to the 'hardware' or

'physical' component of wireless devices, as this appears to be a focal point of interest to many authors now. Other studies refer to the 'implementation' or 'management' of these wireless technologies in healthcare organizations, as cost appears to be a determining factor in such implementations. None of the studies appear to have examined the 'usage' aspects of wireless applications. \Consequently the overarching aim of this study is to explore and identify the drivers and inhibitors for adoption of wireless applications in the healthcare industry for data management. Therefore, the main research question addressed in this study is:

“What factors influence the acceptance of wireless technology in the Australian healthcare environment?”

The devices that were considered include handheld devices and associated technology, including PDAs, mini PCs, and laptops connected with wireless cards—but exclude desktop computers and notebook computers that are connected in an organizational LAN environment.

3. RESEARCH DESIGN¹

The research design of this study involves both qualitative and quantitative techniques. The qualitative techniques were employed to obtain 'first-hand' information from nurses using a semi structured interview approach. This is essential because the literature is limited in this aspect. The quantitative method involved developing a survey instrument to obtain nurses' perceived opinion on various factors impacting the adoption of wireless technology for Australian healthcare professionals, as identified from focus group discussions with Australian healthcare professionals. The data were collected in two stages, six months apart. In the first stage, data were collected from staff involved in patient care regarding their adoption and usage behavior of wireless handheld devices. In the second phase, respondents were contacted again for a follow-up survey to understand their changing views and behavior pattern. Healthcare facilities within the state of Queensland in Australia and other specific healthcare facilities were identified for this purpose where wireless devices are used for information sharing purposes. The hospitals were derived from government, private and regional sectors respectively.

While many techniques are available to capture perceptions and attitudes of usage of technology, this study employed focus group discussion sessions and a survey technique (Zikmund, 1994). This included open-ended responses to obtain factors that are not constrained by a pre-determined identification of constructs found in traditional surveys, as well as to determine the importance of the pre-determined factors. Given the exploratory nature of this study, these two techniques are considered important and complementary to each other.

The survey instrument was developed from the focus group discussion sessions. The instrument for this research constituted two broad categories of questions. The first category of questions was related to the adoption and usage of wireless devices in hospitals for data management. The second category consisted of demographic variables. Open ended questions were included in the instrument to obtain unbiased and non-leading information. Prior to administering the questions, a complete peer review and a pilot study were conducted in order to ascertain the validity of the instrument.

For the purpose of this paper, the second stage data collected through the survey were analyzed through SPSS, by using the factor analysis technique to identify drivers and inhibitors for the adoption of wireless technology in the healthcare environment. Findings pertaining to these are presented in this paper.

4. QUALITATIVE²

4.1 Data Collection and Data Analysis³

In this stage of the research a set of five focus group discussion sessions were undertaken to explore the initial views and opinions of Australian healthcare professionals. Each focus group session was restricted to 5 health professional participation. In order to ensure the focus group discussion sessions were conducted on time, the local health district was approached through one of the authors of this paper and suitable candidate groups were identified. After obtaining ethical clearance from both the principal university and the Health District, one of the authors of the paper conducted the focus group sessions. The focus group discussion sessions were conducted in such a fashion as to

¹ The research design is adopted as a central theme in most of our other research work.

² Lesson learned from Pakistan studies were used in this study.

³ This part of the paper has been reproduced from the first stage publication in an international conference by both the authors of this paper.

minimise any disruption to nurses' work schedules, ensure comfort of nurses in answering questions, minimise any travel time by participants, synchronise the 'participants' language with participants, and to prompt healthcare professionals when unknown aspects were encountered by participants.

Prior to the focus group discussion sessions, the line managers were approached for permission to release staff for focus group discussion sessions. Initially a consent letter was distributed to obtain consent for focus group discussion sessions and the list of people for focus group discussion sessions was provided to the Health District. The focus group discussion sessions were recorded using a digital recorder and catalogued as per ethics requirements. These focus group discussion sessions were then transcribed for data analysis.

Participants for the focus group discussion sessions were selected from the nursing staff in Queensland Health. The participants were initially screened for suitability, as only healthcare professionals working with technology were considered for this purpose. Healthcare professionals with a vast background were chosen (pharmacy, oncology and emergency departments). As the participants belonged to the Health Department, no further screening was employed for sampling.

The instruments of this research consisted of two broad categories of questions. The first category of questions was related to the adoption and usage of wireless devices in hospitals for patient care. The second category consisted of demographic variables. Open ended questions were included in the instrument to obtain unbiased and non-leading information. Prior to administering the questions, a complete peer review and a pilot study were conducted in order to ascertain the validity of the instrument.

The data was analysed using NVivo software application. Prior to the analysis of data, the focus group discussion sessions were transcribed using university services. The transcribed focus group discussion sessions ranged from 8 pages to 17 pages in length, covering a total of 260 pages of rtf format file. Two experienced transcribers were involved in the process of converting the interviews into a computer file. Once the files were transcribed, they were read while listening to the conversation in order to verify accuracy of transcription. Any portion missing during the transcription process was filled in, as the researchers possessed sufficient knowledge of various technical terms used in this domain. The files were then printed and scanned for facilitators and inhibitors. These themes were identified on paper and then used as nodes in NVivo while examining the text files.

Once the themes were identified as free nodes using NVivo, the text snippets were examined again to aggregate the nodes into groups. Initially, over 200 free nodes were realised and they were grouped into facilitators and inhibitors by examining the text passages again. They were grouped into the two major categories as trees and a simple correlation analysis using the table facilities was also performed on the various nodes.

5. RESULTS

The analysis using NVivo confirmed that the following facilitators and inhibitors can be extracted from the data collected from the participants of the focus groups. Our aim was to identify the factors impacting wireless handheld devices adoption and use. We did not attempt to classify them in an order of priority. However, while we will be conducting more data analyses to classify them in proper groups, this exercise is beyond the scope of this project. The following table lists the facilitators and inhibitors of wireless technology adoption in nursing.

Table 1: Organized facilitators and inhibitors of the adoption of wireless hand held technology

Drivers	Inhibitors
Access massive amount of information	Awareness
Adverse event	Confidentiality
Alert clinicians	Wireless coverage
Will free up some time and resources	Health policy and procedures
Communication benefits	How does it work?
Current competence	Know how
Cut down on paperwork	Problems with technology
Fantastic benefit	Reliance on technology
Handover reports	Schedule
Health policy	Security
	Staff shortages

Intensive activities	Testing
Managing data	Unreliable
Medication errors	User friendliness
Medication schedule	User attitude
Mental health	Training
More timely recording	Infrastructure
Quicker response	Availability of electronic records
Reduction in documentation	
Remote monitoring	
User friendliness	
Volume of information	

6. QUANTITATIVE

6.1 Data Collection and Data Analysis

A survey instrument was developed from the findings of stage one and 2000 questionnaires were distributed among the healthcare professionals in the state of Queensland. From 2000 questionnaires only 373 useable questionnaires were received, that is, a response rate of 18.7%. Responses from the survey were transcribed into a spreadsheet file and a visual basic interface was used to generate the numerical code to analyze the data by SPSS. Initially, data was reviewed for missing or incorrect values; additionally, descriptive analysis techniques were used to review the data from the SPSS. In order to ensure the reliability of the instrument, a reliability test was run on the complete instrument and the group of selected variables. The reliability test of Cronbach's alpha was performed through SPSS and values are shown below:

Table # 2: Reliability analysis of the instrument

Descriptions	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
Reliability of all the items in the instrument	.903	.924
Reliability of only Likert scale items in the instrument	.934	.935

The above table shows the value of Cronbach's Alpha for the non-demographics variables in the survey instrument. Items 1 to 46 were used to measure respondent responses on a 5 point Lickert scale. These questions were the only questions used to measure the responses to identify the determinants of adoption of wireless handheld devices in the healthcare environment. Hair suggested Cronbach's Alpha ($\alpha = .934$) represents an excellent level of reliability for the instrument (Manning and Munro, 2007, Hair et al., 2006).

In order to identify the determinants or the adoption of wireless handheld technology in the Australian healthcare environment, data reduction technique provided by SPSS (Version 15) was employed. Factor analysis was conducted through SPSS to group the related items. Initially, factor analysis was conducted through 'Principal Components' and 'Rotated Component Matrix' techniques with 'Varimax' rotation. In addition to this number of group (components) were not limited to any number and 'maximum interaction for convergence' was limited to 0.5 (Suppress absolute value) in this analysis. This exercise was repeated several times until meaningful groups of related items were found. The output of such factor analysis is provided below in Table 3.

The factor analysis indicated that factors can be grouped together in seven meaningful factors. These factors were named as Organizational Readiness (OR), Technological Readiness (TR), Perceived Readiness (PR), Clinical Practices (CP), Compatibility (C), Social Demographic (SD), and Intention to Use (ITU). We also conducted reliability analysis through Cronbach's Alpha for the factors identified through the data reduction technique factor analysis.

Table # 3: Reliability of the factors identified through factor analysis

Description of composite	Questions included	Cronbach's Alpha
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variable		
Technical	Q2, Q3, Q4, Q5, Q6, and Q7	.799
Readiness		
Perceived	Q9, Q10, Q11, and Q12	.683
Readiness		
Organizational	Q19, Q20, Q21, and Q22	.806
Readiness		
Clinical	Q23, Q24, Q25, Q26, Q27, Q28,	.925
Practices	Q29, and Q30	
Social	Q31, Q33, and Q34	.659
Demographic		
Compatibility	Q36, Q37, Q38, Q39, and Q40	.798
Intention to use	Q41, Q42, Q43, Q44, Q45, and Q46	.899

It can be seen from Table 3 that Cronbach's Alpha value for the individual items contributing to the composite variable is between .710 and .925; the average value of Cronbach's Alpha for all the composite variables is .819 and value of Cronbach's Alpha for the whole instrument from questions 1 to 46 is .935. According to (Hair et al., 1998) this value of Cronbach's Alpha is judged to represent a good level of reliability.

Table # 4: Data reduction through factor analysis

Descriptions	Component						
	CP	ITU	TR	C	OR	PR	SD
WHT improve time management	.838						
WHT improve reporting procedures	.826						
WHT improve quality of care	.806						
WHT error reduction	.798						
WHT enhance clinical communication	.788						
WHT high quality of information	.750						
WHT resolves workload issues	.699						
WHT improve evidence base practice	.672						
I will use if I believe we are ready		.828					
I will use if WHT is compatible with existing ICT		.817					
I will use if organization is technically ready		.813					
I will use if integrated with organization culture		.802					
I will use if organization is ready		.774					
I will use if we can integrate clinical practices		.651					
Reliability of infrastructure			.767				
Easy interface			.733				
Connectivity			.733				
Availability of local support			.642				
Size, weight and compactness			.618				
Access to technical people			.556				
Access to clinical data				.756			
Integration with other devices				.738			
Clear standards				.693			
Integration of business process				.597			
Reliability of WHT				.530			

Leadership role	.808
Strategic direction	.768
Lack of management commitment	.719
Organizational support	.543
Healthcare environment	.801
Existing work practices	.617
Proper planning and procedures	.616
Support from colleagues	.541
Organizational policies	.672
Social values	.635
Organizational culture	.602

Therefore, the initial framework for the adoption of wireless handheld devices in the Australian healthcare environment can be formulated as follows:

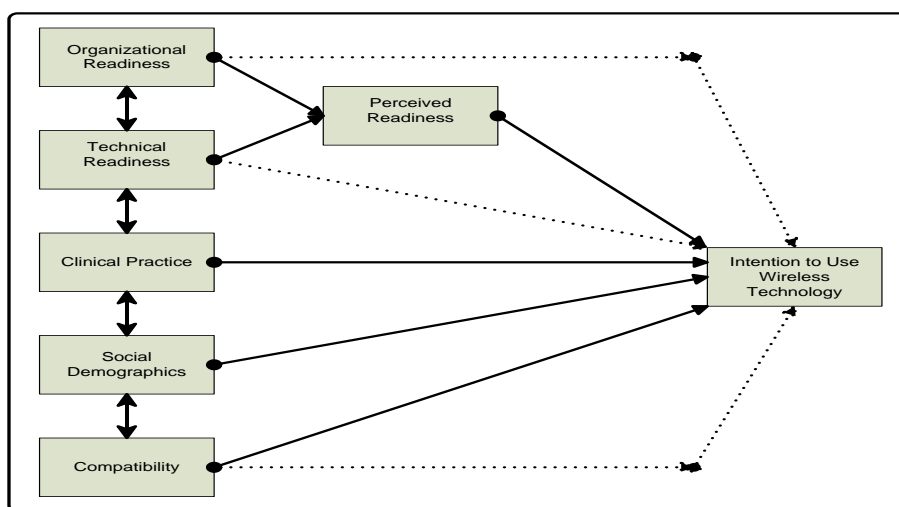


Figure # 1 Initial framework for wireless handheld devices in Australian healthcare setting

7. DISCUSSION

As can be seen from the above data analysis, Australian healthcare professionals are quite concerned about technological, organizational and change management and, if the organizational aspects are not handled appropriately, it can have a negative effect on the adoption of wireless technology in the healthcare environment. It is also clear that Australian healthcare professionals are clearly concerned with factors specific to healthcare environment, such as working environment, demographics, clinical process and compatibility issues associated with other sensitive technology used in healthcare environments. At the same time, it can also be seen that Australian healthcare professionals are keen to adopt the wireless handheld technology, with specific advantages or perceived usefulness indicating their awareness of reduction in error, quality of care, and clinical performances. Australian healthcare professionals see the technology as having positive potential in the Australian environment. It is quite clear that the views and opinions of Australian healthcare professionals mentioned in this study are either through their personal experiences, or use of the handheld technology on a limited scale.

The data analysis indicates that wireless technology can be used to facilitate access to clinical information and communications between clinicians, maximise clinician time, increase patient safety, and accomplish the strategic and business goals of health organisations. Taken together, these factors have a direct impact on clinical usefulness and its effectiveness. However, achieving clinical usefulness with wireless handheld devices can be a challenge and has several implications.

In order to minimize the challenges, firstly, the highest security standards must be achieved. This includes direct end-to-end data encryption, authentication, authorization, maintenance of audit logs and session management (Chen et

al., 2004, Yu and Jothiram, 2007). While high security standards are essential, their implementation is likely to affect usability. For example, the download and encryption of patient information from the server where it is stored into a wireless handheld device may not be prompt. Sax et al. (2005) argue that clinicians may experience increasingly longer time lags when they carry out increasingly more complex procedures. This is likely to adversely affect clinical usefulness and, hence, decrease user acceptance.

Closely associated with security is also the issue of patient confidentiality, which is of significant importance and concern. Although wireless handheld devices have locking security features and password protection functions which activate during periods of inactivity, the frequent use of these functions during the clinicians' busy daily schedules may have an impact on clinical usefulness.

Secondly, the design of an effective human-computer interface, while challenging, constitutes a key factor for the acceptance of the technology and its routine use by healthcare workers (Chen et al., 2004, Wu et al., 2007). This is an important development consideration as the relevant information should be easy to navigate and read, and needs to be presented in an organised fashion when required within the resource limitations (e.g. screen size and bandwidth) of a wireless handheld environment. Usability factors are not only likely to constitute an acceptance barrier, but can also be the cause of medical errors. Bates et al. (Bates et al., 2001) argue, 'While it may be easy and common to blame operators for accidents [or errors], investigation often indicates that an operator "erred" because the system was poorly designed' (p. 301). Therefore, medical errors can also occur due to poor usability. Taken together, these factors would contribute to reduce medical errors. By implication, it is important to involve users in the design of the wireless applications, thereby maximising their clinical usefulness (Grist et al., 2007).

Thirdly, simply acquiring and implementing wireless technology alone would be sufficient to accomplish clinical usefulness and, subsequently, drive adoption and diffusion. Wireless technology should be integrated with process improvement and organisational change. Process improvement requires the optimisation of clinical processes and should be supported by technology, rather than driven by it (Smith, 2004). Ultimately, this is likely to generate significant patient outcomes and financial improvements within health organisations.

Fourthly, as suggested by the empirical evidence collected in this study, cost constitutes an important factor which will affect the integration and, subsequently, the success of wireless handheld devices in the healthcare setting (Sax et al. 2003). Typically, costs include the software, the server, upgrades of healthcare organisations' existing networks and legacy systems, the costs of the handheld units themselves, as well as maintenance and support. While existing research in this area argues that such technology has the potential to decrease charting time and medical errors and enhance patient care quality, there is no evidence that comparisons of costs before and after the implementation of wireless technology have been made. This suggests that further research is required, but, more importantly, it shows that, indirectly, costs have the potential to affect clinical usefulness and threaten widespread adoption.

8. CONTRIBUTION

The main contribution of the paper comes in three aspects. The first aspect is in using a mixed methodology approach in a unique way in order to establish reliability and validity of the instruments and processes. We used qualitative component in order to properly understand the views of health professionals. We also used the focus group transcripts to develop the instrument. Using the transcript helped us to frame questions that are meaningful to health professionals. When we started our research we found that existing questionnaire items (derived from IS literature) make limited sense to health professionals. By using this novel approach, we found that the statistical reliability was found to be high. Further, we were able to understand the context better as well as able to establish 'partnership' with health colleagues.

The second aspect that we found beneficial was regressing themes that were context dependent. For example, certain themes were Australian Health System specific. By properly organizing the focus group discussions, we were able to identify in early stages the differences between various contexts (for example Indian healthcare issues were different to that of an Australian system in regulatory aspects). Such an approach helped us to use terminologies that were context dependent.

The third main contribution that we were able to make lies in the fact that factors that have been established in traditional desktop based technology acceptance models are no longer valid to mobile devices in their entirety. For example, the two widely accepted factors 'perceived ease of use' and 'perceived usefulness' appear to be making limited sense in health domain because of health professionals deal with a variety of complex technologies on a daily basis and hence 'ease of use' appears to be insignificant. Other factors such as organizational readiness etc appear to be influencing technology adoption. Further, social aspects appear to be bridging the gap between various entities in a

health domain in terms of technology usage and diffusion.

While the above aspects are not new, perhaps for the first time, we were able to provide some evidence as to non technology features that influence technology acceptance. Further, the limited nature of focus group discussions and the wide generalisability of survey instrument appear to be in agreement in this study. Thus, the qualitative study we used provided us the direction to ensure that our quantitative instrument was valid, relevant and appropriate. This helped us to save time and effort in a relatively new domain where samples were drawn from.

9. CONCLUSION

This paper is an exploratory study to examine the adoption of wireless technology in an Australian healthcare scenario. In answering the main research question—what factors influence the acceptance of wireless technology—this study established that access to data, communication enhancements, policy development, high quality information transmission and easy interfaces are some of the factors influencing the acceptance of wireless technology in Australian healthcare systems. The study also identified challenges, such as the lack of management commitment, in realizing the acceptance.

The study comes with a set of limitations. We examined merely ‘perceptions’ and did not actually measure the usage aspects. The respondents considered for this study had a level of awareness of wireless technology. However, it was not possible to measure their in-depth knowledge in using a wireless technology in a health domain. This has an impact on the outcomes reported in this study.

The instrument derived for this study was initially from the literature and then through a survey extracted from the interview transcripts. There was a time lag between the interviews and the survey preparation. The technology, in the current era, develops quickly and we were not able to capture any change in the views as a result of the time lag. This should be kept in mind when interpreting the outcomes of this study.

Despite these limitations, this study was able to conclude that Australian healthcare professionals are confident about the use of wireless handheld technology. The respondents considered for this study have indicated that they can see substantial benefits if the technology is implemented properly, and appropriate technical support provided.

Future research in this domain needs to examine implications of wireless handheld technology at an organizational level in the healthcare environment and its adoptability to unique healthcare settings. We used first order regression models, however, future research can use higher order statistical regression techniques to explore the effects of these determinants on the adoption of wireless handheld devices in the healthcare setting.

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