

# ICT Adoption and Implementation Benefits in Medical Centers: A Study of Pusrawi Hospital, Malaysia

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**Abstract.** The purpose of this study was to examine the benefits of Information and Communication Technology (ICT) adoption and implementation in medical centers in Kuala Lumpur, Malaysia. The primary objective of this study was to identify the factors and benefits derived from ICT adoption among nurses. Quantitative research has been applied in the study where questionnaire was used as the instrument. Based on the data gained in this study, information storage and retrieval were the major benefits of ICT through four selected factors, namely type of ICT applications, type of ICT skills, ICT adoption factors and benefits of ICT adoption. The result indicated that most of the nurses agreed that ICT improved business efficiency as well as assisted them in daily communication in their interpersonal relationships. From the findings, it was learnt that the hospitals should plan on improving ICT skills and knowledge among their nurses to ensure the job efficiency. In future research, respondents of multi level positions can be further discussed, besides focusing on the drawbacks of ICT adoption in public and private hospitals.

**Keywords:** Information and Communication Technology (ICT), Adoption, Implementation.

## 1. Introduction

Information and Communication Technology or ICT actually refers to a broad spectrum of technologies that allow users to get, produce, and share ideas and resources, Paul (2003). ICT consists but not limited to e-mail, decision support system, and health information system. This kind of technology is able to assist medical professionals in medical coding, medical billing, registration, accounting, communicating among others. Based on Ahmad (2008), in Malaysia, increasing demand for health tourism, the hospitals need to upgrade their healthcare services to meet international standards, the increasing pressure for government to upgrade the healthcare industry and today's tech-savvy consumers demanding better healthcare and customer services are some of the driving factors in adopting automation in the healthcare industry. According to Baldwin (2006), ICT plays an important role in delivering healthcare today. Healthcare professional including doctors and nurses are occupied in what is seen as a radical action plan for improving the National Healthcare Service in United Kingdom. Wilson and Anderson (2000) mentioned that while health information technology provides the greatest impact on administration functions, such as decreasing paperwork and workload of healthcare professionals, increasing administrative efficiencies and expanding access to affordable care, it also has shown effectiveness in preventing medical errors by enforcing clinical guidelines and protocols and reducing health care cost.

With health care cost and quality assurance taking central roles in the health care agenda, increasing attention is being directed towards the potential of ICT to lower health care spending and to improve efficiency, quality of healthcare delivery, and safety of medical care. As evidence by relevant literature drawn from numbers and sources influencing survey, annual saving from efficiency resulted from ICT adoption can be generated approximately 77 billion dollars (RAND, 2006). Therefore this study attempts to firstly identify the factors that influence ICT adoption, then examine the benefits derived from it and finally to determine the association of ICT skills and the perception of ICT benefits.

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## 2. Literature Review

In the context of this study, Information and Communication Technology (ICT) refers to a broad spectrum of technologies that allow users to get, produce and share ideas and resources. The process is being helped by mastering the development using of the tools of ICT where its knowledge is a like new technology to acquire with rare and contained resources (Kizza, 2007). Today's all organizations are utilizing ICT technologies to cut costs, improving efficiency and also to provide a better customer services. Additionally, governments around the world are adopting ICT to facilitate a business environment and to encourage open competition trust and security, and standardization (Ashrafi and Murtaza, 2008). According to Stroetmann, Dobrev, Karla and Jean, (2007) added that, like other industrial sectors, strong substantiation suggests that it is not ICT in isolation that leads to benefits like increase quality of care, reduced errors and the same time the cost saving is significant, but must suitable with balancing investment in workplace, human capital and healthcare processes reformation. The application of ICT healthcare systems is without any exception that provide timely information is proven to save lives, improve the quality and efficiency of the health delivery system and contain the cost (Vivianen, 2007).

### 2.1. Benefits

- **Integration of decision support tools across hospitals**

According to Marrow (2005), there are number of sources and forms that clinical and administrative staff in hospital have to deal with. No matter which department they have to communicate with each other across hospital system. These technologies must be tailored to meet these needs of information environment. It is crucial to enable these technologies to be flexible for decision making across and within the hospital setting.

- **Provision of self-care information to public**

There were plenty of initiatives by the healthcare organization to increase the importance of self-care. In this sense ICT were able to provide potential access of personnel because of the development of internet and changing communication media. The new web service and interactive interface will able to assist the self care processes, including self diagnosis in certain conditions and able to assist in giving instruction whether involving clinical professionals (Marrow, 2005).

- **Provision of Online Training Tools for Healthcare Professionals**

As mentioned by Marrow, (2005), clinical staff who are taught on how to use ICT devices will be more adaptive to their working environment. In some circumstances, ICT tools such as mobile devices will provide opportunities to carry out the training at convenient points while working. This will increase interaction between other healthcare professionals who engage the similar training without fear being distracted from their daily work activities.

- **Increase interaction between personnel in healthcare setting**

According to Simon, Evette, Tutty, Operskalski & Korff (2004), adoption of ICT will provide interaction between patients and practitioners. Usage of video conferencing will provide audio visual communication and the telephones will provide communications for the same purpose. In Canada, there were shown that acceptance of video conferencing is comparatively high, attributable to its advantages in reducing cost for physicians for reduced time for consultation and cost saving for patients to travel.

### 2.2. Factors Influencing ICT Adoption in Healthcare Industry

- **Integration of decision support tools across accessibility**

The main factors of influencing ICT adoption among general practitioners are to provide access to the health services for the citizens at any time and any place and especially for the patients from rural areas and small towns. ICT understandable advantage in remote or rural areas is the improved access to health services eliminating sometime the need for a patient to travel to a distant hospital (Rudowski, 2006).

- **Quality of care**

The factors that influencing the ICT adoption will contributed significantly to better quality of care. This is very important to ensure healthcare practitioners provide better services for patients. ICT adoption will lead in decreasing redundant work or information about patients. Thus, it can help general practitioners to improve the quality of care in the industry (Rudowski, 2006).

- **Market demand**

The Malaysian Ministry of Health (MOH) is the lead agency and the main provider of health care services in Malaysia. It is about ninety eight percent (98%) of subsidy for all public medical expenses. The private health care sector has been expanding rapidly in recent years and is targeting more wealthy population. Increasing awareness and rising demand for better healthcare facilities are driving installations of advanced technology systems in hospitals in Malaysia. As a result, public and private hospitals are adopting ICT in healthcare industry (Ahmad, 2008).

- **Cost**

The continuously rising cost is the main problem of the contemporary health service in many countries. These cost may not be acceptable both for developing and developed countries. ICT can decrease the cost of health care by decentralizing the care that enabling medical services at a lower level where they are cheaper (Rudowski, 2006).

- **Increase business capacity**

Riquelmen (2002), has found that the adoption of ICT is significantly associated with business size (in terms of either the number of employees or turnover). Another study conducted by Blackburn and Athayde (2000) and MacGregor and Vrazalic (2006) revealed a significant link between the level of Internet adoption and the business size which was defined in terms of the number of employees. It showed the capacity of a business would grow parallel with the ICT adoption rate.

- **Increased internal efficiency**

The success on ICT adoption was run by a study conducted by Quayle (2002). It showed the factors that influenced ICT reported by small medium enterprise managers, included reduced administration costs, reduced stock, improved marketing and improved quality of information. Nevertheless, Tetteh and Burn (2001) proved that the adoption of ICTs substantially increased internal efficiency.

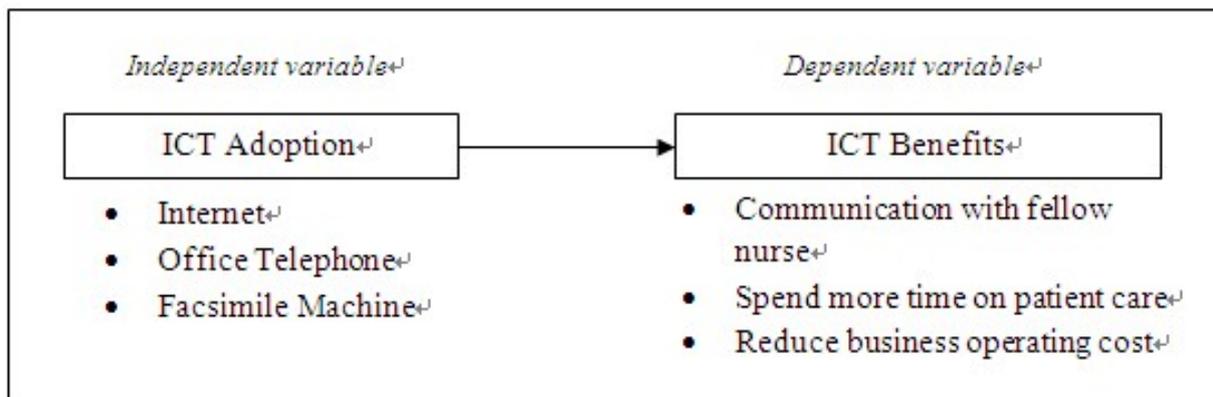


Figure 1: Conceptual Framework

### 3. Literature Review

The sampling frame in this study was obtained from the Human Resource Department of Pusrawi Hospital Sdn. Bhd. The sampling technique used was simple random sampling where from a population of 90 nurses, 77% or a total of 70 nurses were the respondents of the study. A set of questionnaire was used as a survey instrument and Statistical Package in the Social Science Software (SPSS) version 17.0 was used to analyze the collected data.

### 4. Findings

It is found that from the findings, most of the respondents agree that ‘ICT can improve in business efficiency’ and ‘ICT is very useful for information storage and retrieval’ with both of the variables share the highest mean value of 3.71. These explain the benefits derived from ICT adoption in Pusrawi Hospital Sdn. Bhd.

Table 1: ICT can improve in business efficiency.

	Frequency	Percent	Mean	SD
Disagree	1	1.4		
Uncertain	27	38.6		
Agree	33	47.7		
Strongly Agree	9	12.		
<b>Total</b>	<b>70</b>	<b>100</b>	<b>3.71</b>	<b>.70</b>

Table 2: ICT is very useful for information storage and retrieval.

	Frequency	Percent	Mean	SD
Disagree	1	1.4		
Uncertain	28	40.0		
Agree	31	44.3		
Strongly Agree	10	14.3		
<b>Total</b>	<b>70</b>	<b>100</b>	<b>3.71</b>	<b>.72</b>

The finding shows that the highest mean is 3.71, referring to the respondents believe that '*ICT can improve communication with my colleagues*'. The second highest mean is also 3.71, showing that respondents feel that their task required them to adopt ICT. It is concluded that the factors that influenced ICT adoption in Pusrawi Hospital Sdn. Bhd. would be on their IT related tasks in order to improve their service in patient care. This is due to improvement of ICT usage among their nurses where they become more IT savvy in carrying out their tasks especially to search for information through the Internet.

Table 3: ICT can improve my communication with other colleagues.

	Frequency	Percent	Mean	SD
Uncertain	30	42.9		
Agree	30	42.9		
Strongly Agree	10	14.3		
<b>Total</b>	<b>70</b>	<b>100</b>	<b>3.71</b>	<b>.70</b>

Table 4: My task requires me to adopt ICT.

	Frequency	Percent	Mean	SD
Disagree	16	22.9		
Uncertain	19	27.1		
Agree	33	47.1		
Strongly Agree	2	2.9		
<b>Total</b>	<b>70</b>	<b>100</b>	<b>3.71</b>	<b>.85</b>

From the findings, it is concluded that most of the nurses in Pusrawi Hospital Sdn. Bhd. have skills in word processing. This can be proved by the highest mean score of 4.08. The second highest mean is on the skills of composing, sending and storing email which is 3.98. These proved that the nurses use their ICT skills by keeping in touch among them and the doctors using email application, especially to arrange patients' visits and at the same time benefit them in terms of task efficiency and faster outcome.

Table 5: Usage of Word Processing

	Frequency	Percent	Mean	SD
Disagree	1	1.4		
Uncertain	5	7.1		
Agree	51	72.9		
Strongly Agree	13	18.6		
<b>Total</b>	<b>70</b>	<b>100</b>	<b>4.08</b>	<b>.55</b>

Table 6: Usage of Composing, Sending and Storing E-mail Application

	Frequency	Percent	Mean	SD
Disagree	2	2.9		
Uncertain	15	21.4		
Agree	39	55.7		
Strongly Agree	14	20		
<b>Total</b>	<b>70</b>	<b>100</b>	<b>3.98</b>	<b>.75</b>

## 5. Acknowledgements

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