

Technology Acceptance in Healthcare Service: A Case of Electronic Medical Records (ERM)

Anuar Mohamamad and Alwi Mohd Yunus

Faculty of Information Management, Universiti Teknologi MARA, UiTM Selangor, Malaysia,

DOI: 10.6007/IJARBS/v7-i11/3522 URL: <http://dx.doi.org/10.6007/IJARBS/v7-i11/3522>

Abstract

This study extends applicability of the Technology Acceptance Model (TAM) to test user acceptance of EMR in the hospital. This study aims to assess the EMR characteristics which could affect the healthcare profession's belief in accepting the usage of EMR in UiTM Medical Specialist Centre, Malaysia (UiTMMSC), Malaysia. Besides measuring the effectiveness of the system towards the organization's excellence, this study expected to guide the UiTMMSC management in structuring the initiatives to promote the EMR usage among the healthcare professions. The significant of this study is to ensure future research by expanding the similar topic of research with the exploration on specific EMR characteristics or healthcare profession's belief by focusing of particular programs for detail assessment.

Keywords: Electronic Medical Record, Healthcare, Perceived Usefulness, Perceived Ease Of Use, Technology Acceptance Model

1. Introduction

The healthcare industry is constantly evolving. This evolving affected and changed the tools healthcare professionals utilize in order to provide quality patient care. The conventional paper-based medical records has been replaced with Electronic Medical Records (EMR). An EMR is a record containing all patient medical detail including demographic information, history, physical examination, investigation and treatment, medication and others in digital format. According to Haslina and Sharifah Mastura (2005), as cited by Nurul Izzatty and Nor Hazana (2011), EMR plays an important role in providing patients' medical histories, which include computerized clinical information system that collects, stores, and displays patients' information. With implementation of EMR, the opportunity for patients to receive improved coordinated care from healthcare providers and easier access to their health information. It's a way to make it easier for everyone to be better informed and more involved in the patient's healthcare (Rodriguez, 2011). EMR is one of the modules under the broader concept of Total Hospital Information System (THIS). In Malaysia, THIS is the project under Ministry of Health (MOH) with the objective of providing a complete electronic system for paperless hospital environment to offer quality health services to the public. MOH defined THIS as quotes by Roshidi Hassan (2012), as a system with an integration of clinical, administrative and financial systems. THIS is made up of various applications such as Person Management, Scheduling, Order Management, Clinical

Documentation, Pharmacy Information System, Laboratory Information System, Radiology Information System, and other (Roshidi Hassan, 2012).

Research has suggested that the use of electronic medical record has the potential to help improve safety, quality, and the cost efficiency of healthcare services. However, according to Love, et al. (2012) and Wright, et al. (2013), many healthcare providers still not realized the benefits of the EMR usage since its adoption throughout the healthcare industry has been generally slow. This statement supported by Arman, A. A., & Hartati, S. (2015), that there are several factors that contribute to the low adoption of EMR system which including high cost, concern for the privacy patient's data, social influence, system is too difficult to use and lack of training. According to Liu & Cheng (2015), Paper-based records are still by far the most common method of recording patient information for most hospitals and practices in the U.S. most of the doctors still find their ease of data entry and low cost hard to part with. However, as easy as they are for the physicians to record medical data at the point of care, they require large amount of storage space compare to record in electronic form. Similar situation in Malaysia, retention schedule for physical records be held for a minimum of seven years, same as in the US by law. The costs to store all the media in paper and film format, per unit of information differ dramatically from that of electronic storage media. When paper records are stored in different locations, collecting them to a single location for review by a health care provider is time consuming and complicated, which can be simplified by using an electronic record.

Many studies that have been done to evaluate the user acceptance and examine the factor influence the user acceptance to the EMR system among healthcare professional. However, in this paper we focus on the ERM system known as uniMEDS system that is developed and implemented by UiTM Medical Specialist Centre, Malaysia (UiTMMSC), from the first implementation phase until today, there is no study that has been done to examine user acceptance of the system they developed. This study is important because, the success of EMR implementation is largely dependent upon the cooperation and acceptance of its users. The aim of this study is to examine the factors that influence UiTMMSC healthcare workers' acceptance of EMR system and to identify the characteristic of EMR that leads to acceptance of the use.

2. Literature Review

2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

Based on previous conducted studies, the EMR plays important roles in delivering quality healthcare services to the patients and EMR implementation is largely dependent upon the acceptance of the physicians and other healthcare professions. According to Holden & Karsh (2010), as cited by Mammen & Weeks (2014), knowing the factors that shaped one's intentions would allow organizations to manipulate those factors in order to promote acceptance and increase IT use. There are numerous framework and model developed to analyze the acceptance of healthcare professions toward EMR system. Arman, A. A., & Hartati, S. (2015), in their study to analyze factors influencing the acceptance of medical personnel on EMR system using the proposed model, developed conceptual model based on Unified Theory of Acceptance and Use of Technology (UTAUT). According to Venkatesh (2003), UTAUT is

behavioral information system models developing by combining 8 models of individual acceptance to information system.

2.2 Technology Acceptance Model (TAM)

The term acceptance of technology has been used by researchers from different backgrounds. According to Huang, Chen & Hsieh (2014), TAM developed by (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) that describes acceptance as users' decision about how and when they will use technology. The Technology Acceptance Model according to Vathanophas & Pacharapha (2010), is an adaptation of the generalized TRA (Theory of Reasoned Action) proposed to specify user acceptance and usage behavior for information technology. There is various study that focus on information technology acceptance such as (Arman, A. A., & Hartati, S., 2015; Mammen & Weeks, 2014; Liu and Cheng, 2015; Steininger et al., 2014; Vathanophas & Pacharapha, 2010). The Technology Acceptance Model (TAM) as agreed by Holden & Karsh (2010) and Hu et al. (1999), and cited by Steininger et al. (2014), is a suitable approach to predict and explain physicians' reactions to health IT (HIT) particularly in Electronic Health Records (EHR) and Electronic Medical Record (EMR). This statement is supported by Davis (1993), as the user acceptance is often the pivotal factor determine the success or failure of an information system.

2.3 Electronic Medical Record (EMR)

Electronic Medical Record can be defines as an electronic system with applications that manipulate or process any information for the purpose of coordinating healthcare and health related services of an individual (Castillo, Martínez-García, & Pulido, 2010). Basically, EMR is the digital version of Patient Medical Records that contain the demographic information, history, treatment, medication, progress note, etc. The information in EMRs does not easily transmit or transfer outside of the healthcare institution. In fact, the patient's record might need to be printed out and delivered by mail to specialists and other members of the care team. According to Alhaqbani (2010), EHR can be defined as a repository of information regarding the health status of a subject of care in computer readable form, stored and transmitted securely, and accessible by multiple authorized users (Ozair et al., 2015). Gartner (2005), refines the EHR definition as an aggregation of patient-centric health data that originates in the patient record system of multiple independent healthcare organizations for the purpose of facilitating care across organizations. Basically the EHR focus on the total health of the patient. EHR are designed to reach out beyond the healthcare organization that originally collects and compiles the information. They are built to share information with other healthcare providers or more than one healthcare organization.

For this study purpose, it is appropriate to clarify the difference between an Electronic Health Record and an Electronic Medical Record because EMR and EHR are often confused. EMR system is a computerized health information system used by healthcare provider to record detailed encounter information such as patient demographics, diagnosis, and treatment, while EHR data is a consolidation of the patient's various medical records, including multiple EMRs created by different healthcare providers. In Malaysia's healthcare setting, the EHR system is being managed by Health Informatics Center (*Pusat Informatik Kesihatan*), Ministry of Health

where they gather the patient’s information from Government Hospital, Private hospital, Teaching Hospital and Army hospital in one system called *Sistem Maklumat Rawatan Perubatan (SMRP)*.

In this study there are various model and approaches that have being used in order to explore on the Acceptance of EMR system in healthcare industries. For this theoretical framework, the researcher adopts the framework from various models and also from the literature review. However, among the approach, the most common model and approach being adopted are including Technology Acceptance Model (TAM) by Davis, UTAUT model adopted by Arman, A. A., & Hartati, S. (2015), TAM and UTAUT model adopted by Katharina Steininger 2014. The main model for this research is adopted from Vichita Vathanophas & Tullawat Pacharapha (2010).

There are one dependent variables, two mediating variable and four independent variables. In this study the relationship between the independent variables, mediating and dependent variable are examined and hypotheses are proposed.

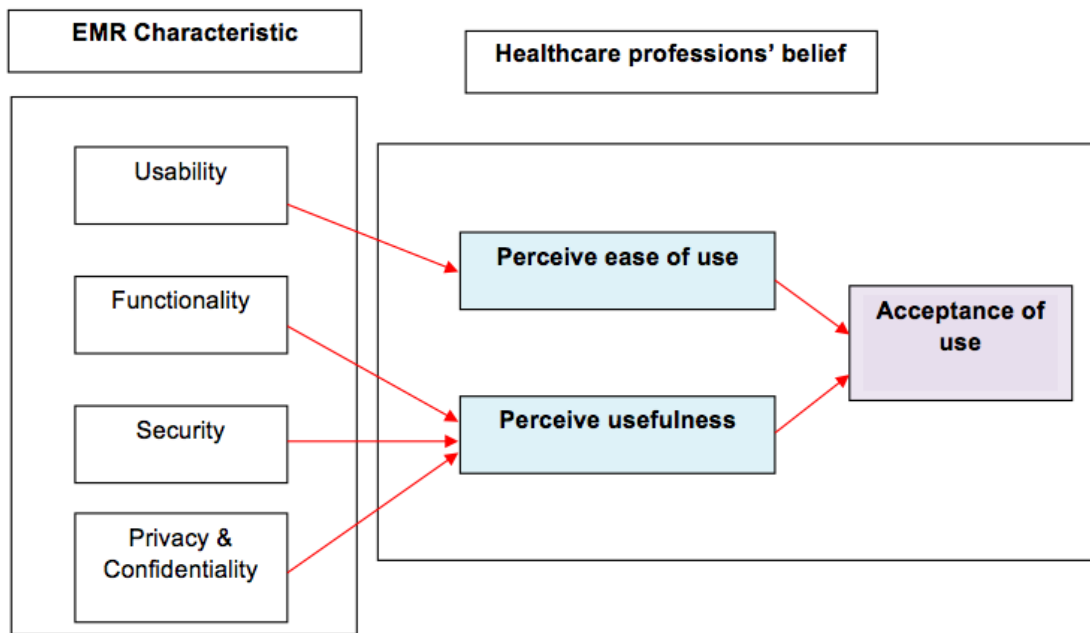


Figure 1. Research Framework

The Figure 1 shows the relationship between independent variable, mediating variable and dependent variable of the study. The Independent Variable (IV) in this study is the characteristic of EMR which is usability, functionality, security and privacy & confidentiality. Two Mediating Variable are perceived ease of use and perceived usefulness and one Dependent Variable (DV) of this study are acceptance of use. In the original model, privacy is excluded because the results showed that “Perceived need for security” have a significant impact on perceived usefulness, while “Perceived need for privacy” did not have a significant impact on perceived usefulness but have an impact on perceived need for security.

3. Methodology

The main purpose of this research is to examine the factors that influence UiTMMSC healthcare worker' perceptions of EMR and to identify the characteristic of EMR that leads to acceptance of the use. The respondent that involved in this research is the clinical, clinical support and non-clinical support staff at UiTMMSC Sungai Buloh who has the access to uniMEDS system. The populations that involved in this study are the healthcare worker at UiTM Medical Specialist Centre, Sungai Buloh who directly uses the uniMEDS system in performing their daily work. The total number of population at UiTMMSC are 703 and the active users that have the access to the system are 277. Therefore the research setting is at organization level since the research will be conducted at a specific organization and the finding reflect to the whole organization. In apply quantitative method, which is questionnaire to collect data from the respondent. After obtaining the questionnaires, data analysis is done through quantitative methods, where the researcher analyzes the data Statistical Product and Service Solutions (SPSS) software to evaluate the descriptive analysis of the finding.

4. Analysis and Results

4.1 Perceived usefulness of EMR

Table 1 presents the descriptive statistic of five measurements for user perceived usefulness of EMR implemented at UiTMMSC. The mean statistics range from 3.40 and 3.47 with the overall mean is 3.44, indicating that the respondents' inclination that in overall the respondents is somewhat perceived the usefulness of the EMR.

Table 1. Descriptive statistic for perceived usefulness of EMR.

Items	Minimum	Maximum	Mean	Std. Deviation
Using uniMEDS system in my job would enable me to accomplish task more quickly.	1	5	3.40	1.101
Using uniMEDS system would improve my job performance	1	5	3.45	.989
Using uniMEDS system would enhance my effectiveness on the job	1	5	3.47	1.025
Using uniMEDS system would make it easier to do my job	1	5	3.43	1.084
The uniMEDS system is useful in my job	1	5	3.47	1.032
Valid N (listwise)				

N = 170

1=Strongly Disagree; 2=Disagree; 3=Moderate; 4=Agree; 5= Strongly Agree

4.2 Perceived ease of use

Table 2 presents the descriptive statistic of four measurements for user perceived ease of use of EMR system implemented at UiTMMSC. The mean statistics range from 3.26 and 3.46 with the overall mean is 3.35 indicating that the respondents’ inclination that in overall they are somewhat agreed on perceived ease of use of EMR system implemented at UiTMMSC.

Table 2 Descriptive statistic for perceived ease of use of EMR.

Items	Minimum	Maximum	Mean	Std. Deviation
Learning to operate the uniMEDS system would be easy for me	1	5	3.46	.899
I find the uniMEDS system is flexible to work with	1	5	3.26	.997
It was easy for me to become skillful at using the uniMEDS system	1	5	3.41	.926
UniMEDS system make it easy for me to do what I want to do	1	5	3.28	1.016
Valid N (listwise)				

N = 170

1=Strongly Disagree; 2=Disagree; 3=Moderate; 4=Agree; 5= Strongly Agree

4.3 Usability of EMR

Table 3 displays the descriptive statistic of six measurements for usability of EMR system that give impact toward user perception of ease of use the EMR system. The mean statistics range from 3.15 and 3.37 with the overall mean is 3.30 indicating that the respondents’ inclination that in overall they are somewhat agreed the uniMED usability give impact toward their perception on perceived ease of use of EMR system implemented at UiTMMSC. However, the researcher noticed that the lowest mean is regarding display interface of uniMEDS system with only 3.15.

Table 3. Descriptive statistic for usability of EMR.

Items	Minimum	Maximum	Mean	Std. Deviation
Database in uniMEDS organized into the predefined field containing a range of clinical variables	1	5	3.37	.898
Approaches for uniMEDS can be easily used to input data e.g. template, drag drop, check box	1	5	3.30	.963
uniMEDS has user friendly displays of output data i.e. graphic approach or multimedia	1	5	3.15	.985
uniMEDS permits timely access and retrieval	1	5	3.33	1.026
uniMEDS structure the stored data in a well-defined standardized classification that support direct data entry	1	5	3.33	.908
In case of lawsuit / medico-legal, the information stored in uniMEDS are admissible in court of law	1	5	3.33	.939
Valid N (listwise)				

N = 170

1=Strongly Disagree; 2=Disagree; 3=Moderate; 4=Agree; 5= Strongly Agree

4.4 Functionality of EMR

Table 4 exhibits the descriptive statistic of six measurements for functionality of EMR system that positively affect user perception of usefulness of the EMR system. The mean statistics range from 3.28 and 3.59 with the overall mean is 3.43 indicating that the respondents' inclination that in overall they are somewhat agreed the uniMEDS functionality give impact toward their perception on usefulness of EMR system implemented at UiTMMSC. The highest mean with 3.59 is regarding the flexibility of the uniMEDS system where the respondents agree the system is flexible where new module can be developed or add on based on the user need.

Table 4. Descriptive statistic for functionality of EMR.

Items	Minimum	Maximum	Mean	Std. Deviation
uniMEDS inform me clearly a patient’s clinical problems	1	5	3.51	1.060
uniMEDS inform me clearly a patient’s associated existing health status	1	5	3.50	.968
uniMEDS support daily assessment of patient care outcomes	1	5	3.30	.947
uniMEDS document clinical decisions	1	5	3.28	1.030
uniMEDS link with databases of clinical records to provide a care history	1	5	3.39	.947
uniMEDS functions is flexible and new module can be develop/ add on based on user needs	1	5	3.59	.903
Valid N (listwise)				

N = 170

1=Strongly Disagree; 2=Disagree; 3=Moderate; 4=Agree; 5= Strongly Agree

4.5 Security of EMR

Table 5 displays the descriptive statistic of four measurements for security of uniMEDS system that positively affect toward user perception of usefulness of the EMR implemented at UiTMMSC. The mean statistics range from 3.27 and 3.52 with the overall mean is 3.39 indicating that the respondents’ inclination that in overall they are somewhat agreed the uniMEDS security give impact toward their perception on usefulness of EMR system implemented at UiTMMSC.

Table 5. Descriptive statistic for security of EMR.

Items	Minimum	Maximum	Mean	Std. Deviation
uniMEDS ensures that patients' information will be stored as a mean to ensure security	1	5	3.45	.944
uniMEDS ensures that patient's information will be manipulated as a mean to ensure security	1	5	3.27	.999
uniMEDS ensure that unauthorized person does not have the access to the system	1	5	3.52	.953
The security measure in uniMEDS are sufficient to ensure the safety, privacy and confidentiality of patient information	1	5	3.30	1.087
Valid N (listwise)				

N = 170

1=Strongly Disagree; 2=Disagree; 3=Moderate; 4=Agree; 5= Strongly Agree

4.6 Privacy and confidentiality of EMR

Table 6 exhibits the descriptive statistic of five measurements for privacy and confidentiality of uniMEDS system that give impact toward user perception of usefulness of the EMR system. The mean statistics range from 3.33 and 3.55 with the overall mean is 3.42 indicating that the respondents' inclination that in overall they are somewhat agreed the uniMEDS privacy and confidentiality positively affect their perception on usefulness of EMR system implemented at UiTMMSC. The highest mean with 3.55 is that the respondents slightly agree that privacy and confidentiality of patient information is one of the main concern in EMR system.

Table 6. Descriptive statistic for privacy and confidentiality of EMR.

Items	Minimum	Maximum	Mean	Std. Deviation
uniMEDS ensures that patients' information will be stored as a mean to ensure confidentiality	1	5	3.42	.987
uniMEDS ensures that patients' information will be disseminated as a mean to ensure confidentiality	1	5	3.33	.967
uniMEDS ensures that patients' information will be collected as a mean to ensure privacy and confidentiality	1	5	3.38	.938
uniMEDS determine level of authorization to ensure the privacy and confidentiality of patient information is secure from unauthorized access	1	5	3.43	.936
Privacy and confidentiality of patient information is one of the main concern in Electronic Medical Record (EMR)	1	5	3.55	.952
Valid N (listwise)				

N = 170

1=Strongly Disagree; 2=Disagree; 3=Moderate; 4=Agree; 5= Strongly Agree

5. Discussion

5.1 Perceived ease of use of the user affects intention to use EMR

The level of perceived ease of use is determined by the average score or mean for overall item. The findings in each item showed the variety of respondents' perception level with majority of the respondents agree that perceived ease of use affect the intention to use the EMR system implemented by UiTMMSC with mean score of 3.35. even though the score is acceptable, the achievement is quite low and the hospital need to take action on ensuring the system the develop are easy to be use by the user. It is concluded that the healthcare professions'' at UiTMMSC perceived ease of use of the EMR system develop by UiTMMSC and affect their intention to use.

5.2 Perceived usefulness of the user affects intention to use EMR

The results shows that there is a significant relationship between perceived usefulness that affects the intention to use the system. The researcher aware that the perceived usefulness given higher impact toward the intention to use compared to the ease of use with mean score of 3.44. This is mainly because, the respondent expectation of the EMR system is

more useful toward their day-to-day job and improve their job performance but, the system is not ease to be use. One of the reason is on the user interface which will be discussed later in the recommendation section.

5.3 Usability of EMR affects users' perceived ease of use

It can be concluded that usability of the EMR does affects users' perceived ease of use other the EMR system with mean score range between 3.15 and 3.37. The highest mean is 3.37 for database in the EMR system where the respondents feel that the database in uniMEDS system are well organized into predetermine field containing range of clinical variable. And the lowest means is on the interface of the system where the respondents feel that the user interface of the system is not friendly and the output of data is not well organized.

5.4 Functionality of EMR affects users' perceived usefulness

The result shows that there is a significant relationship between functionality of EMR that affects the users' perceived usefulness of the system with overall mean of 3.43. the researcher notice that flexibility of the system with new module can be develop based on user need contribute the highest mean with 3.59. this is because, currently the IT department had already release new module for the uniMEDs system which are the appointment management, bed management and itemize billing with their next project is focusing on developing the inpatient module.

5.5 Security of EMR affects users' perceived usefulness

The result shows the range of mean is from 3.27 and 3.52 with overall mean of 3.39 indicate that the respondents agree that security of EMR does affect the user's perceived usefulness of the EMR system. However, between three variables that affect perceived usefulness (functionality, security and privacy & confidentiality), the researcher noticed that privacy score the least significant relationship that contribute to the EMR characteristic that affect perceived usefulness of the system. This is due to the respondent feel that between those three variable, the uniMEDS is lack on security measure taken to ensure the safety of patient information.

5.6 Privacy and confidentiality of EMR affects users' perceived usefulness

The result shows the overall mean is 3.42 indicating that the variable does affect users' perceived usefulness of the system and the score is the highest signification relationship that contribute to EMR characteristic that affect perceived usefulness compared to functionality and security.

6. Conclusion

Based on researcher observation of the uniMEDS system, IT department need to improve on the security of the system in term of alteration and changes monitoring, ensuring the completeness of the information entered, and other measure to ensure the security of the system. There should be control mechanism to ensure that doctors fill in all the required field

when treating the patient. This is because, sometime, there are no doctors name in the clinical notes which make it difficult for the staff to trace back the doctors that key in the information. Besides that, there should be control mechanism and close monitoring to the information in the uniMEDS system that user cannot simple editing, altering or make changes to the existing information. This is to ensure the integrity, evidence and authenticity of the information stored. In the future, the study should focus more broad scope of healthcare industry. The research should focus on whole Teaching Hospital in Malaysia which includes University Malaya Medical Centre (UMMC) Universiti Kebangsaan Malaysia Medical Center (UKMMC), International Islamic University Medical Centre (IIUMMC), Universiti Sains Malaysia Medical Centre (USMMC) and others, so that the researcher can get broader pictures of the EMR acceptance in Malaysia's Teaching Hospital. This is because, EMR is really important for Teaching Hospital as they involved in many research and data analyzed and most of the EMR in Teaching Hospital is developed in-house compared to Ministry of Health (MOH) Hospital which their EMR system are outsourcing to the vendor.

References

Arman, A. A., & Hartati, S., (2015). Development of user acceptance model for electronic medical record system. *2015 International Conference on Information Technology Systems and Innovation (ICITSI)*. Retrieved from <http://doi.org/10.1109/ICITSI.2015.7437724>

Asfaw, E. (2008). *Health insurance portability and accountability act (HIPAA): Confidentiality and privacy from the perspectives of the consumer and the physician*. Available from ProQuest Dissertations & Theses Global. Retrieved from <http://search.proquest.com.ezaccess.library.uitm.edu.my/docview/304831007?accountid=42518>

Castillo, V., Martínez-García, A., Pulido, J. A. (2010). Knowledge-based taxonomy of critical actors for adopting electronic health record systems by physicians: a systematic literature review. *BMC medical informatics and decision making*. 10(6). Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/20950458>

Chen, C., Garrido, T., Chock, D., Okawa, G. & Liang, L. (2009). The Kaiser Permanente Electronic Health Record: Transforming and streamlining modalities of care. *Health Affairs*, 28, 323-333. Retrieved from doi: 10.1377/hlthaff.28.2.323

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 13(3), 319-340. Retrieve from <http://www.jstor.org/stable/249008>

Dodds, S. (2004). Economic aspects of privacy, confidentiality, and consent (Unpublished

master's thesis). Queen's University, Ontario Canada. Retrieved from <http://search.proquest.com.ezaccess.library.uitm.edu.my/docview/305090649?accountid=42518>

Holden R.J. and Karsh B.-T. (2010). Methodological Review: The Technology Acceptance Model: Its Past and its Future in Health Care. *Journal of Biomedical Informatics* 43(1), 159-172. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1532046409000963>

Hammad, J. (2015). *Examining the factors that influence physicians' perceptions toward electronic medical record (EMR) acceptance* (Order No. 3731975). Available from ProQuest Dissertations & Theses Global. (1734870273). Retrieved from <http://search.proquest.com.ezaccess.library.uitm.edu.my/docview/1734870273?accountid=42518>

Hu P.J., Chau P.Y.K., Sheng O.R.L, and Tam K.Y. (1999). Examining the Technology Acceptance Model Using Physician Acceptance of Telemedicine Technology. *Journal of Management Information Systems* 16 (2) 91- 112. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/07421222.1999.11518247>

Jahangir, N., & Begum, N. (2008). The role of perceived usefulness, perceived ease of use, security and privacy, and customer attitude to engender customer adaptation in the context of electronic banking. *African Journal of Business Management*, 2(2), 32. Retrieved from <http://search.proquest.com/openview/3efc3dfa496b2d90753befdc6f828907/1?pq-origsite=gscholar>

Kamoie, B. & Hodge, J. (2004). HIPAA implications for public health policy and practice guidance from the CDC. *Public Health Reports*, 119, 216–219. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1497612/>

Liu, C.-F., & Cheng, T.-J. (2015). Exploring critical factors influencing physicians' acceptance of mobile electronic medical records based on the dual-factor model: a validation in Taiwan. *BMC Medical Informatics and Decision Making*, 15(1), 1–12. Retrieved from <http://doi.org/10.1186/s12911-014-0125-3>

Mammen, A. & Weeks, R. (2014). Electronic Medical Record (EMR) technology acceptance by healthcare professionals in South Africa. *Proceedings of PICMET '14 Conference: Portland International Center for Management of Engineering and Technology; Infrastructure and Service Integration*. Retrieved from <http://ieeexplore.ieee.org/xpls/icp.jsp?arnumber=6921221>

Mason, B. (1999). Ethics, privacy, and confidentiality issues related to the application of information technology in health care (Unpublished doctoral dissertation). University of Missouri-Columbia. Retrieved from <http://search.proquest.com.ezaccess.library.uitm.edu.my/docview/304511271?accountid=42518>

Mulligan, C. (2016, January 21). Privacy breached, Sudbury patient alleges. Retrieved April 06, 2017, from <http://www.thesudburystar.com/2016/01/21/privacy-breached-sudbury-patient-alleges>

Ismail, N. I. and Abdullah, N. H. (2011). Developing electronic medical records (EMR) framework for Malaysia's public hospitals. *Humanities, Science and Engineering (CHUSER), 2011 IEEE Colloquium*. Retrieved from <http://ieeexplore.ieee.org.ezaccess.library.uitm.edu.my/stamp/stamp.jsp?tp=&arnumber=6163702>

Ornstein, C. (2009, May 15). Kaiser Hospital Fined \$250,000 for Privacy Breach in Octuplet Case. Retrieved April 06, 2017, from <https://www.propublica.org/article/kaiser-hospital-fined-250000-for-privacy-breach-in-octuplet-case-515>

Ornstein, C. (2016, April 21). New York Hospital to Pay \$2.2 Million Over Unauthorized Filming of 2 Patients. Retrieved April 06, 2017, from https://www.nytimes.com/2016/04/22/nyregion/new-york-hospital-to-pay-fine-over-unauthorized-filming-of-2-patients.html?_r=0

Pilgrim, T. (2015). 'EZ' and 'EY'. Figure 2f from: Irimia R, Gottschling M (2016) Taxonomic revision of Rochefortia Sw. (Ehretiaceae, Boraginales). *Biodiversity Data Journal* 4. Retrieved from doi: [doi:10.3897/bdj.4.e7720.figure2f](https://doi.org/10.3897/bdj.4.e7720.figure2f)

Prater, V. S. (2014). Confidentiality, privacy and security of health information: Balancing interests. Retrieved from <http://healthinformatics.uic.edu/resources/articles/confidentiality-privacy-and-security-of-health-information-balancing-interests/>

Rodriguez, L. (2011). Privacy, security and electronic health records. Retrieved from <https://www.healthit.gov/buzz-blog/privacy-and-security-of-ehrs/privacy-security-electronic-health-records/>

Hassan, R. (2012). Implementation of Total Hospital Information System (THIS) In Malaysian Public Hospitals: Challenges and Future Prospects. *International Journal of Business and Social Research*, 2(2), 33-41. Retrieved from <http://thejournalofbusiness.org/index.php/site/article/viewFile/189/188>

Saunders, M., Lewis, P. & Thornhill, A. (2009). *Research methods for business students* (5th ed.). New York: Prentice Hall.

Sekaran, U. & Bougie, R. (2010). *Research methods for business: A skill building approach*. United Kingdom: John Wiley & Son Ltd.

Sekaran, U. (2003). *Research methods for business: A skill building approach*. United Kingdom: John Wiley & Son Ltd.

Steininger, K., Stiglbauer, B., Baumgartner, B. & Engleder, B. (2014). Factors explaining physicians' acceptance of electronic health records. *2014 47th Hawaii International Conference on System Sciences*. Retrieved from <http://doi.org/10.1109/HICSS.2014.347>

Van der Haak, M., Wolff, A. C., Brandner, R., Drings, P., Wannemacher, M., & Wetter, T. (2003). Data security and protection in cross-institutional electronic patient records. *International journal of medical informatics*, 70(2), 117-130. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1386505603000339>

Venkatesh, V. M. G., Morris, G. B., and Davis, F.D. (2003). User acceptance of Information Technology: toward a unified view, *MIS Quarterly*, 27(3), 425–478. Retrieved from <http://www.cob.calpoly.edu/~eli/Class/p25.pdf>

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 45(2), 186–204. Retrieve from <http://pubsonline.informs.org/doi/abs/10.1287/mnsc.46.2.186.11926>

Vithanophas, V., & Pacharapha, T. (2010). Information technology acceptance in healthcare service: the study of Electronic Medical Record (EMR) in Thailand. *PICMET 2010 Technology Management For Global Economic Growth*, 1-5. Retrieved from <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5603355&isnumber=5602021>

Wang, C. K. (2015). Security and privacy of personal health record, electronic medical record and health information. *Problems and Perspectives in Management*, 13(4). Retrieved from http://businessperspectives.org/journals_free/ppm/2015/PPM_2015_04_Wang.pdf

Warren, M. (2016, May 12). North Bay nurse who snooped into 5,800 patients' records gets four month suspension. Retrieved April 06, 2017, from <https://www.thestar.com/news/gta/2016/05/12/north-bay-nurse-snooped-into-5800-patients-confidential-records.html>

Zhang, J. & Walji, M. F. (2011). TURF: toward a unified framework of EHR usability. *Journal of biomedical informatics*, 44(6), 1056-1067. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1532046411001328>