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EMR ADOPTION BY SMALL CLINICS IN MALAYSIA: AN EXPLORATORY STUDY AND THEORETICAL EXPLANATION

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Abstract

Development of a national health exchange has been the focus of governments in many countries as a means of delivering quality health care at affordable cost. In deployment of a national health exchange, an important facilitator is the adoption and usage of Electronic Medical Record (EMR) systems by primary health care providers such as small clinics, and secondary/tertiary providers such as speciality clinics and hospitals. However, in spite of expected benefits to physicians, adoption and usage are found to be low, even in some advanced countries. Adoption levels also vary widely across countries. In this research we used the theoretical lens of TPB to conduct four case studies of small clinics in Malaysia to explore their intent to adopt EMR systems. Based on our findings, we develop a theoretical understanding of the small clinics intent towards EMR adoption and propose that the theory of planned behavior (TPB) when integrated with institutional theory serves to provide better explanation of adoption of new technology in situations of low visibility of the technology, as is generally observed in developing countries. The findings have implications for researchers interested in health-care technology diffusion.

Keywords: Electronic medical records, small clinics, theory of planned behaviour, institutional theory, adoption

1 INTRODUCTION

Quality health care at affordable cost has been the focus of governments in many countries. Towards this end, the use of appropriate information and communication technologies is being given priority in many health care initiatives. One such initiative is the Electronic Medical Record (EMR) systems. EMR systems are computer based systems used for recording patients' medical history and managing health care. Benefits of EMR over traditional paper-based storage and access of patient records are many, and it depends on the extent of functionalities in an EMR. At the micro-level, health care providers benefit from fast access to medical records, cost and space savings from digital storage, better readability (no handwritten prescriptions) leading to reduction of errors in medicine dispensing, analytics for medication results, analytical support for diagnosis etc.. Patients benefit from better health care and support. At the macro-level, statistics can be quickly compiled and aggregated at regional and national levels to support macro-level health care policies. Other stakeholders such as insurance providers benefit from documented evidence of illness, medication and hospitalisation, thus leading to quick settlement of insurance payments and avoidance of fraudulent insurance claims. Evidence in prior research substantiates these views. For example, a study of EMR effects in primary health care clinics found that EMR improves the quality of patient care, decreases medical errors, and generates positive financial return on investment to the health care organization (Wang et al. 2003).

However, in spite of benefits and the availability of EMR systems for many years now, its adoption and usage are found to vary widely across countries. An international health policy survey conducted in 2012 with primary care physicians in several countries indicates adoption rates varied from 98% (in Netherlands) to 68% (in US). Interestingly, the percentage of meaningful use of EMR in primary care centers was much lower, varying from 7% (in Germany) to 68% (in UK). Meaningful use is defined as satisfaction of a set of state capacities by the system as well as full utilization of systems by physicians to enable those capacities (Gary et al. 2011). The table below illustrates the survey findings.

Country	Reported use	Meaningful use
UK	97%	68%
AUS	92%	60%
NETH	98%	33%
USA	69%	27%
CAN	56%	10%
GER	82%	7%

Table 1. International health policy survey of EMR adoption (2012)

The low rate of adoption and low effective utilization thwarts the efforts of countries and their governments in achieving their goals of quality health care. Studies have been conducted to examine the reasons for the low rate of diffusion and meaningful use. Amongst the barriers identified are high initial investment cost, uncertain return on investment, initial time to set up the system, low system usability, complementary changes required in business processes, inadequate electronic data exchange with other systems, privacy/security concerns, and lack of incentives to switch from existing paper-based systems (Millers & Sim 2004; Porter 2013). Countries have attempted to remove these barriers by adopting certain policies. For example, US government has allocated \$27 billion to be granted over 10 years to eligible clinicians who demonstrate meaningful use of EMR (Blumenthal & Tavenner 2010). Denmark has been successful in achieving 98% adoption of EMR in primary care practices by offering financial incentives, and developing a national network which enables clinics to exchange data without having any concern about data exchange compatibility (Gary et al. 2011).

While academic literature and industry reports provide information on EMR adoption patterns and barriers to adoption in developed countries, not much is known about the trend in developing

countries. We therefore conducted this study in the Malaysian context. Malaysia is a developing country and stresses on the role of small and medium firms in driving the economy. Malaysia's health care infrastructure has a large number of small clinics and their numbers have grown rapidly. As of December 31, 2011, there were 6,589 registered small private medical clinics, 1,576 registered private dental clinics and 985 registered government health clinics (Report of Ministry of Health, Malaysia 2012). The Malaysian government also aims to attract people from across the world for quality medical treatment at competitive prices. The number of foreign patients in Malaysia in 2011 reached 583,296 patients, delivering revenue of RM 511 million, a remarkable growth compared to year 2001 with 75,210 patients which delivers revenue of RM 44 million (Suleiman 2013). In terms of IT usage in the health care sector, most Malaysian hospitals have been using electronic means of storing patient data since 1990's; however, it is reportedly far from the manner envisaged of matured users of EMR systems (Noraziani et al, 2013). Moreover, there are few published studies on the usage of IT in small clinics in developing countries.. Since small clinics are a large part of the medical service infrastructure, it is important to know their preparedness for EMR adoption. EMR adoption by small clinics is a necessary condition for achievement of goals of a national health exchange, improved health care, and in the context of Malaysia, boosting medical tourism.

We used theoretical sensitivity of the TPB to conduct four case studies of small clinics in Kuching, Malaysia. The objective was to investigate and understand the following:

- How typical small clinics provide health care and their intent to adopt EMR
- Develop a theoretical understanding of the barriers perceived by small clinics
- Develop a theoretical understanding of how the barriers can be reduced

In the next section we discuss prior literature on small clinics perceptions of barriers to EMR adoption and the relevance of theoretical tenets of TPB in understanding adoption. We then discuss the research methodology, followed by data analysis and discussion of findings. We conclude with recommendations for theoretical extension of TPB with institutional theory for better insights and explanation of adoption in situations where there is low visibility of a new technology, as is generally observed in developing countries

2 LITERATURE REVIEW

In a study of EMR adoption amongst Canadian physicians, lack of relative advantage for many business processes, system complexity, compatibility with physician preferences, past experience, difficulty of adapting EMR to the practice, and lack of organizational slack are mentioned as barriers, while improvement in some business processes are also mentioned (Greiver et al. 2011). High initial investment cost, uncertain return on investment, initial time to set up the system, low system usability, complementary changes required in business processes, inadequate electronic data exchange with other systems, privacy/security concerns, and lack of incentives to switch from existing paper-based systems are also mentioned as deterrents to adoption (Millers & Sim 2004; Porter 2013). Another US based study mentions system complexity, interoperability, staff training as deterrents perceived by physicians in EMR adoption, though some advantages such as Less paper/storage, redundancy in record keeping, greater patient control and transparency, improved data accuracy and improved recording capabilities are also mentioned. (Kumar & Aldrich 2011).

In terms of theories, researchers have tried to explain EMR adoption based on TAM or its extensions (e.g. Chau & Hu 2002; Yarborough & Smith 2006; Holden & Karsh 2010). In one research, TAM has been modified substantially with factors of self-efficacy, social influence, attitude and facilitating conditions (Aggelidis & Chatzoglou 2009), which are essentially factors of the TPB. The basic tenet of TPB is that attitudes, subjective norms and perceived behavioural control (PBC) influence

behaviour primarily through their impact on behavioural intention (Fishbein & Ajzen 1975; Ajzen, 1991). The TPB has been widely used to explain a wide range of behaviours. It has been used to study ICT adoption by SMEs (e.g. Goby 2006; Hsu & Chiu 2004; Hsu et al. 2006). Based on the tenets of TPB, Khalifa and Davison (2006) investigate electronic trading systems adoption by SME firms where they use the concepts of perceived desirability (which maps to anticipated benefits that shape attitude formation) and perceived feasibility (which corresponds to the behavioural control construct of TPB). Since small clinics are small business outfits that provide health care service, we draw on the TPB theory to investigate future adoption of EMR by small clinics in Malaysia. TPB allows deeper understanding of the cognitive aspects linked to perceptions, and we argue it is therefore useful in theoretical understanding of the cognitive basis for the perceived barriers to EMR adoption, which is necessary for remedial actions that can be taken to foster adoption.

3 RESEARCH METHODOLOGY

Four small clinics were chosen for the study. Two of the four clinics used paper based systems. One clinic used electronic means to store and access patient records. The fourth clinic used a mix of paper and electronic means. None of the clinics used any EMR software. The details of the four clinics are given in Table 2. Interviews were conducted based on an interview protocol developed on the tenets of TPB. The questions were a mix of open and semi-structured, allowing the respondents to express their opinions freely with regard to their current practices and views of EMR. Data gathered from the interview was analysed for theoretical understanding of their perceptions of facilitators and barriers and how they influenced EMR adoption decision.

4 DATA ANALYSIS AND FINDINGS

The data gathered from interviews and our interpretations are shown in detail in appendix Table 2. Summarised findings are mentioned below:

4.1 Summary of findings

Clinics 1 and 2 have an unfavourable attitude, attributable to lack of relative advantage over existing paper-based systems. They also express concerns of power failure and data entry work, which negatively influences their perceptions of behavioural control in an EMR environment. These findings are similar to previous reports of perceived barriers in developing countries. For example, in a similar study in Mexico, time consuming process of entering the data in real time, especially when a large number of patients are just one-time visitors, is perceived as a hindrance to EMR adoption by physicians (Reynoso & Tulu 2007). Our findings indicate that lack of experience with computer systems, lack of resources, and lack of initiative to learn about current trends of computer-based health practice influences both attitude and PBC. This may be attributed to both-old age of the physicians in these two clinics, and lack of dissemination of knowledge and training by government bodies and software providers on benefits of computerization. In fact, the first author had discussion with SME Corp, Malaysia, a government agency that promotes support for SME growth in Malaysia, and found that plans were being developed to provide education and training to SMEs so as to create awareness of benefits of computerization and adoption of cloud-based systems that could minimize cost of adoption for the SME and reduce maintenance overheads. Such institutional mechanisms in the area of EMR may help adoption of EMR by small clinics. Clinic 3, on the other hand, has a favourable attitude, attributed to understanding of computer based systems and some exposure to EMR systems through attendance in medical conferences. The physician in clinic 3 sees opportunities in utilization of computer system. However, this physician also raised concern of confidentiality of patient data in an integrated EMR environment with sharable data, which negatively influenced perceptions of behavioural control. Clinic 4, which already uses Excel based computer system to store and access patient information has a very positive attitude toward EMR system. This clinic, contrary

to other clinics, considers the positive aspect of EMR and believes that the factors which are identified by other clinics as drawbacks and barriers of implementation can be alleviated by taking appropriate action.

None of the physicians mentioned about any deterrence from the fact that there was no reported instance of EMR usage by any clinic in Malaysia. In general, small clinics maintained a status-quo with paper-based systems as the de-facto standard. This evidence points to the influence of institutional isomorphism in adoption of new technology. It appears that even if support and awareness amongst small clinics is developed through government and software industry initiated (EMR software providers) moves, additional institutional mechanisms such as coercive pressure may be necessary to break the status-quo, without which, the government’s plan of a national health exchange may not be realized. Iacovou et al (1995), and Musawa and Wahab (2012) used the institutional theory to explain EDI adoption and found that perceived coercive pressure influences adoption of electronic data interchange systems where adoption is dependent on participation by other organisations (as is required for a national health exchange). There is also anecdotal evidence that the US government has provided reimbursement incentives but has also stipulated progressive penalties for not adopting EMR within stipulated deadlines. In theoretical terms, this means that TPB, enhanced with institutional theory may better explain adoption of new technology such as EMR where there is little visibility of the technology and institutional mechanisms such as support and government mandates may be required to foster adoption.

5 DISCUSSION AND CONCLUSION

Our findings indicate that TPB in itself may not be adequate to explain adoption of new technology, more so when the technology has not gained visibility and traction. In such situations, institutional mechanisms are likely to play a role in fostering adoption. We therefore propose a theoretical model shown below (Figure 1) to explain adoption of new technology where there is no visibility of the technology and institutional support mechanisms are required to foster adoption.

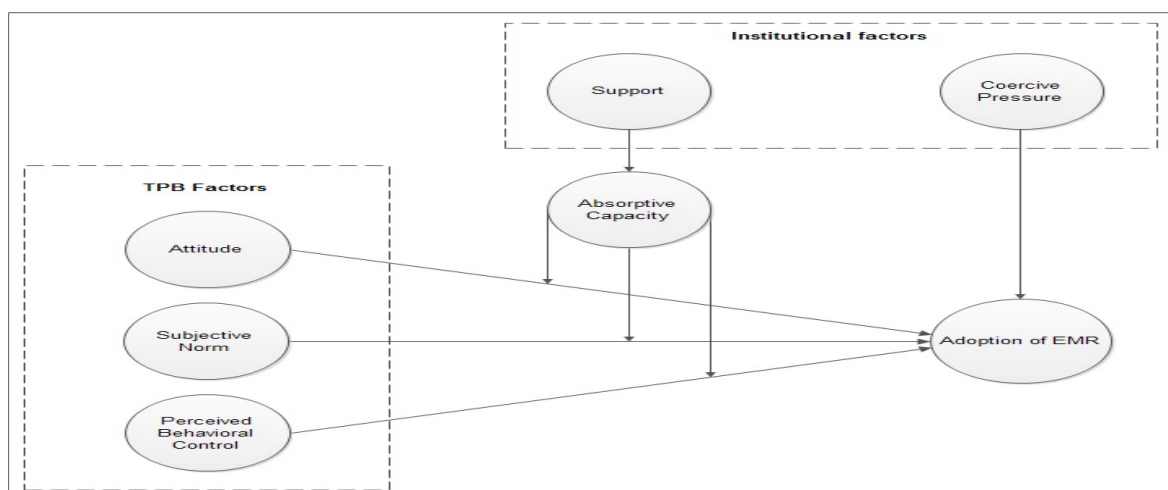


Figure 1. Proposed theoretical model

Institutional theory considers the influence of institutional structures, such as schemes, rules, norms, and routines that serve as influential guidelines for social behavior (Scott 2004). The tenet of this theory implies that decision making process in an organization is not purely influenced by the internal rules and regulations, but also by the organizational culture and institutional aspects in the environment (Iacovou et al. 1995; Oliveira & Martins 2011). Thus institutional mechanisms, in addition to individual attributes or motives, determine behaviour. Social, economic, and political

factors form the institutional structure of a particular environment, which provides firms with advantages for engaging in specific types of activities there. Businesses tend to perform more efficiently if they receive institutional support. The relevance of considering inst. theory in EMR adoption studies lies in the fact that patient data confidentiality is mentioned by almost physicians in EMR deployment scenarios. Data privacy laws and its impact on physician-patient contractual obligations, government's support for small firms by way of financial incentives and training on EMR, support of EMR providers, government approval for use of tested and standardised EMR so as to provide technical reliability of EMR systems, are all institutional mechanisms, that can have crucial impact on attitude and PBC of physicians in regard to their decision to adopt EMR.

Theoretically, institutional support mechanisms such as dissemination of knowledge and training can help to develop the absorptive capacity of small clinics in terms of understanding the full potential and benefits to be derived from EMR, thus helping to strengthen the attitude and create readiness to try EMR. For example, in one study on EMR adoption, it was found that education and support for improvement activities and EMR optimization were likely to help the small practices in maximizing their use of EMRs (Price et al. 2013). In addition since small clinics lack resources to learn about new technology, financial incentives from the government and knowledge support from technology providers can help to develop their absorptive capacity (defined as capability to acquire and assimilate information about new technology). Absorptive capacity aids decision to use new technology such as cloud computing (Banerjee et al. 2012). Institutional mechanisms such as government policies for SME support towards adoption of EMR and support from providers of EMR software would enable small clinics to develop their absorptive capacity and increase their intent towards EMR adoption. Other institutional mechanisms could be Malaysian government's certification of EMR software, which could help to minimise data protection and security concerns of small clinics – a significant barrier to adoption. In situations where there is low visibility of a new technology, as is observed in developing countries, existing practices may continue in spite of institutional support mechanisms as mentioned. In such cases, additional institutional mechanisms such as rewards for early adoption as well as coercive pressure and penalties for non-adoption of new technology initiatives may be necessary, especially when the new technology adoption is part of a wider national level technology based government initiative.

References

- Aggelidis, V.P. and Chatzoglou, P.D. (2009). Using a modified technology acceptance model in hospitals. *International Journal of Medical Informatics*, 78, 115-126.
- Ajzen, I. (1991). *The Theory of Planned Behavior*. *Organizational Behavior And Human Decision Processes*, 50, 179-211.
- Banerjee, P., Latifah, S., Badruddin, S. and Agrawal, A. (2013). Absorptive Capacity: Essence of the Construct and its Determinants. *The Journal of Academy of Business*, Cambridge, 19
- Blumenthal, D. and Tavenner, M. (2010). *The Meaningful Use Regulation for Electronic Health Records*. *The New England Journal of Medicine*, 2010
- Chau, P.Y.K. and Hu, P.J. (2002). Examining a model of information technology acceptance by individual professionals: An exploratory study. *International Journal of Medical Informatics*, 18, 191-229.
- Electronic Medical Records Deadline: Will I Be Assessed Penalties For Not Using An EMR System?*, 2013, viewed 8 March 2014 < <http://www.medicalrecords.com/physicians/electronic-medical-records-deadline>>
- Fishbein, M. and Ajzen, I. (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Boston, MA: Addison Wesley.
- Gary, B.H., Bowden, T., Johansen, I. and Koch, S. (2011). Electronic Health Records: An International Perspective on "Meaningful Use". *Issues in International Health Policy*, The Commonwealth Fund.
- Goby, V. P. (2006). Online purchases in an infocomm sophisticated society. *CyberPsychology & Behavior*, 9, no.1, 423-431.
- Greiver, M., Barnsley, J., Glazier, R.H., Moineddin, R. and Harvey, B.J. (2011). Implementation of electronic records. *College of Family Physicians of Canada*, 57, 390-397.
- Holden, R.J. and Krash, B.T. (2010). The Technology Acceptance Model: its past and its future in health care. *Journal of Biomedical Informatics*, 43, 159-172.
- Hsu, M. H. and Chiu, C. M. (2004). Predicting electronic service continuance with a decomposed theory of planned behaviour. *Behaviour and Information Technology*, 23, no.5, 359-373.
- Hsu, M. H., Yen, C. H. and Chiu, C. M. and Chang, C. M. (2006). A longitudinal investigation of continued online shopping behavior: An extension of the theory of planned behaviour. *International Journal of Human-Computer Studies*, 64, no. 9, 889-904
- Iacovou, C.L., Benbasat, I. and Dexter, A. S. (1995). Electronic data interchange, interorganizational systems, small business, electronic commerce; *MIS Quarterly*, 19 (4), 465-485
- Khalifa, M. and Davison, R.M. (2006). SME Adoption of IT: The Case of Electronic Trading Systems. *IEEE Transactions on Engineering Management*, 53, no. 2, 275-284
- Kumar, S. and Aldrich, K. (2011). Overcoming barriers to electronic medical record (EMR) implementation in the US healthcare system :A comparative study. *Health Informatics Journal*, 16, 306-318.
- Miller, R.H. and Sim, I. (2004). Physician's Use of Electronic Medical Records: Barriers And Solutions. *Health Affairs*, 23, no. 2, 116-126.
- Ministry of Health Malaysia 2012, 'Health Facts 2012', Planning and Development Division
- Musawa, M.S. and Wahab, E. (2012). The adoption of electronic data interchange (EDI) technology by Nigerian SMEs: A conceptual framework. *Journal of Business Management and Economics*. 3(2), 055-068.
- Noraziani, K., Nurul' Ain, A., Azhim, M.Z., Eslami, S.R., Drak, B., Sharifa Ezat, W.P. and Siti Nurul Akma, A. (2013). An Overview of Electronic Medical Record Implementation in Healthcare System: Lesson to Learn. *World Applied Sciences*, 25(2), 323-332.
- Oliveira, T. and Martins, M.F. (2011). Literature Review of Information Technology Adoption Models at Firm Level. *The Electronic Journal Information Systems Evaluation*, 14, no. 1, 110-121.
- Porter, M. (2013). *Adoption of Electronic Health Records in the United States*. Kaiser Permanente International, 2013 Kaiser Permanente.

- Price, M. , Singer, A. and Kim, J. (2013). Adopting electronic medical records; Are they just electronic paper records?. *Canadian Family Physician*, 59, 322-329
- Reynoso, J.M.G. and Tulu, B. (2007). Electronic medical records adoption challenges in Mexico, *AMIA*
- Scott, W.R. (2004). *Institutional Theory: Contributing to a Theoretical Research Program*. Stanford University, Ken G. Smith and Micheal A. Hitts, eds. Oxford UK, Oxford University Press.
- Suleiman, A.B. (2013). *Medical Tourism – Malaysia*. Regional World Health Summit, International Medical University (IMU), Kuala Lumpur, Malaysia.
- Wang, S.J., Middleton, B., Prosser, L.A., Bardon, C.G., Spurr, C.D., Carchidi, P.J., Kittler, A.F., Goldszer, R.C., Fairchild, D.G., Sussman, A.J., Kuperman, G.J., Bates, D.W. (2003). A Cost-Benefit Analysis of Electronic Medical Records in Primary Care. *the American Journal of Medicine*, 114, 397-403.
- Yarbrough, A.K. and Smith, T.B. (2007). Technology acceptance among physicians: A new take on TAM. *Medical care research and review*, 64, 650-672.

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Appendix

Clinic 1	
This is an eye specialist clinic with more than 30 years of operation. The age of doctor is around 70 and the average number of patients referred to this clinic is 20 patients per day. This clinic's medical record is based on card system. Each patient is given a card with unique ID. A file is created for each card and all medical information about the patient is stored in the file. The file is retrieved based on the card ID. Prescription, billing, patient interview notes, blood-pressure details, eye examination results are all hand-written and stored in the patient file.	
Attitude	PBC
<p>“I am 70 years old, I can retire any time. There is not much time left in here for me, why do I want to invest in a computer system?”</p> <p>Interpretation: It appears from the above statement that age influences attitude towards new technology.</p> <p>“Even if such a system is free I don't think I will shift. If I am younger or there is a young doctor here then then it is possible”.</p> <p>Interpretations: It may be inferred that age influences initiative to spend time to learn about new technology, acquire information about the new technology, and also capacity to process information related to the technology and assess the potential for likely benefits as well as risks.</p> <p>Financial incentives do not change this attitude.</p> <p>“There is no problem in manually recording the patients record if they bring their cards back”</p> <p>Interpretation: Though there is reported inconvenience in the present paper-based system (patients forget their cards which puts added time and cost burdens on the clinic), it does not seem to have any influence in developing a favourable attitude towards EMR adoption. The doctor prefers to go along with these problems rather than move to an entirely new EMR based system.</p>	<p>“I am not very literate in typing. It will be two fingers typing, and that will take a lot more time than writing. So I will have to write and I also have to do a second job - transfer it to computer.”</p> <p>Interpretation: It is inferred here that lack of resources could be a deterrent. Since there is no secretarial support (typing facility), it surfaces as an impediment and negatively influences readiness to try.</p> <p>“Sometime we have electricity breakdown. You have to have a backup. We do not have a generator, so we cannot use any data”</p> <p>Interpretation: Infrastructural deficiency creates an impediment. Also implied is lack of financial resources to combat this deficiency, which negatively influences readiness to try EMR. Ready access to existing paper-based records is seen as an advantage.</p> <p>“A lot of doctors nowadays are unethical. You pass them money and they will pass the information to you”</p> <p>Interpretation: In respect of integration of EMR into a national health exchange where other doctors could have access for continued patient care, the doctor feels there would be confidentiality issues and subsequently legal issues, which negatively influences the perceptions of control of data and creates an impediment to adoption.</p>

Table 2. Data Analysis

Clinic 2	
<p>This clinic is a general clinic with around 40 years of operation. The age of doctor is around 70. The average number of patients in this clinic is 30 per day. The storage and access of medical records is card based, as in clinic 1.</p>	
Attitude	PBC
<p>“Since current practice suits our needs, we never thought of moving into using computer systems”</p> <p>Interpretation: Two things are inferred here -lack of knowledge of computer usage trends in health care practice, and lack of initiative to explore better means of serving patients. Satisfaction with existing system can be assumed to have played a big role in such attitude formation.</p> <p>“We shift to a system which enables us to do the same job with less work. If the system increases the workload, we prefer to continue with our current procedure”</p> <p>Interpretation: Attitude toward a system is strongly shaped by the benefits it can offer to the business, especially in the short term. If a system does not provide fundamental short term benefits, the long term benefits would not play a major role in shaping user attitude.</p> <p>“We do not have infrastructure problems, we have computers and my secretaries are computer literate but due to the problems of computer systems we prefer not to adopt such a system”</p> <p>Interpretation: Capability of an organization to adopt EMR does not influence the attitude if it is believed that the EMR system does not offer major improvements in the business process.</p>	<p>“How can we enter all the previous records in the computer system?”</p> <p>“There might be errors in entering the information”</p> <p>“Typing the information also is another problem since it is hard to key in the patient information every time they visit the clinic”</p> <p>Interpretation: It can be interpreted that preparatory work needed to move to EMR is seen as formidable and lack of resources to do so negatively influence perceptions of behavioural control. Deeper introspection of these statements implies that lack of PBC also influences attitudinal disposition towards EMR.</p> <p>“Computer system may go out of action due to power failure so we cannot access the information at that time”</p> <p>Interpretation: Infrastructural deficiency creates an impediment. Also implied is lack of financial resources to combat this deficiency, which negatively influences readiness to try EMR. Ready access to existing paper-based records is seen as an advantage.</p> <p>“Most patients do not want their information be available to other doctors or clinics”</p> <p>Interpretation: in respect of integration of EMR system and data sharing for a national health exchange, the confidentiality issue becomes a major concern of doctors. They do not want to accept the risk of sharing their patient information with other clinics. Such a point of view negatively influences the PBC and subsequently increases the resistance to adopt EMR system.</p>

Table 2. *Contd.*

Clinic 3	
This clinic is a general clinic. The age of doctor is around 45. The average number of patients which refer to this clinic is 40 patients per day. The medical records process of this clinic is card based	
Attitude	PBC
<p>“Right now the manual approach is ok. Of course, eventually we hope to computerize the whole thing. That will cut down on the waiting time for the patient and the processing time.”</p> <p>Interpretation: This favourable attitudinal disposition is attributable to the age of the doctor (much younger than doctors in other clinics interviewed). Age influences the ability to understand the benefits to be derived from new technology and creates readiness to move to computer based-systems such as EMR.</p> <p>“With computer system it will be a lot easier to handle the business process, as far as the confidentiality issue is not compromised”</p> <p>Interpretation: Even with concerns of patient data confidentiality, which negatively influences PBC, the doctor still has a positive attitude.</p>	<p>“Confidentiality is a big issue, I am quite sure some patients do not want anybody else to access their information, unless there is some way that you can filter it whereby this information is not made available to all. It should be for me to decide who gets access”</p> <p>Interpretation: It appears that EMR adoption at the clinic level is favoured, but integration of the clinic’s EMR with other systems for a national health exchange platform is seen as a problem, which negatively affects perceptions of behavioural control in the integrated EMR environment.</p>

Table2. Contd.

Clinic 4	
This clinic is a general clinic with more than 30 years of operation. The age of doctor is around 60. The average number of patients which refer to this clinic is 50 patients per day. The medical records process of this clinic performed using computer systems. Excel application is used to enter the patients information. Regular back up is performed where the information is copied into a pen drive. Data is also uploaded in sky drive as another mean of back up and access.	
Attitude	PBC
<p>“Computer system can save a lot of time, money and staff”</p> <p>Interpretation: Familiarity with computers (currently uses excel to store and access patient records) influences perceptions of benefit over paper-based systems, which positively influences attitude towards using EMR.</p> <p>“We are ready to adopt EMR system even if the data is shared and managed by government”</p> <p>Interpretation: Prior experience with IT positively influences attitude and readiness to adopt EMR.</p>	<p>“We have faced no problem with our computer based approach in last 30 years”</p> <p>Interpretation: Prior IT experience has served to build perceptions of behavioural control over computer usage, which is also seen to influence attitude.</p> <p>“We back up the files online, I even have a back up in my phone so I can access the information when I am away”</p> <p>Interpretation: Skill and proper use of technology positively influences perceptions of behavioural control.</p>

Table2. Contd.