



UNIVERSITI PUTRA MALAYSIA

**FACTORS INFLUENCING ACCEPTANCE OF CLINICAL DECISION
SUPPORT SYSTEMS AMONG HEALTHCARE PROFESSIONALS IN
MALAYSIA**

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By
POUYAN ESMAEILZADEIJ

**This thesis submitted to the Graduate School of Management Universiti Putra
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November 2011**

DEDICATION

I dedicate this thesis to my parents who have always been my wings to fly up in the sky of learning and have never doubted my dreams. Absolutely without their patience, understanding and caring support, the completion of this work would not have been possible.

This thesis is also dedicated to my sister and brother who have supported me all the way since the beginning of my life and have been a great source of motivation and inspiration.

And

I would like to dedicate my thesis to my beloved grandparents whose faces are pained on my soul forever.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy.

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November 2011

Chair: Professor Murali Sambasivan, PhD

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A variety of Health Information Technology Systems (HITS) in the form of clinical information technology have gradually become established in the healthcare industry. Clinical information technology is considered as a strategic healthcare tool to improve the quality of health care service, the efficiency and effectiveness of healthcare professionals in the health care sector. Clinical Decision Support (CDS) systems are mainly used to assist healthcare professionals (such as physicians and specialists) in decision making and improving the quality of healthcare delivery. If CDS systems are not fully used by healthcare professionals, the effort and investment are doomed to failure. There are concerns regarding the adoption of CDS among healthcare professionals in Malaysia. However, factors affecting healthcare professionals' adoption behavior related to using CDS are still not completely clear. The technology adoption models such as UTAUT are not specially targeted at healthcare professionals and they do not include the unique characteristics of healthcare professionals as well as special features and properties of CDS. The central characteristic of healthcare professionals that is considered in this in this **research is**

professional autonomy. The special features and properties of CDS that are considered in this research are: 1- the level of knowledge codification and knowledge distribution and 2- guidelines and instructions generated by CDS and the level of interactivity between healthcare professionals and the CDS system.

Integration of the healthcare professionals' characteristics with features of CDS can provide a better understanding on IT adoption in the special context of healthcare practice. For this purpose, the original version of the UTAUT has been extended with physician's unique characteristics and special characteristics of CDS systems. This study thus proposes a research framework from a broader and an integrated perspective. To confirm the proposed framework 21 semi-structured interviews with some specialists (from different fields) were conducted in Malaysian hospitals. Furthermore, a survey has been used to evaluate the hypothesized model among 309 healthcare professionals in Malaysia. The structural equation model has been used to test the model in this context. The results stress the importance of perceived threat to professional autonomy, physicians involvement in decision making in CDS planning as well as implementation and also cognitive instrumental processes (mainly, usefulness perceptions) in determining physicians' intention to use CDS systems. The empirical examination shows high predictive power for adoption intention and the influential role of these important variables. A recent study on usage of EMR based on the original UTAUT shows that the model can explain only 20% of the variance in the usage intention of EMR whereas the proposed model of this study can explain 47% of the variance of healthcare professionals' behavioral intention in the CDS setting. The explanatory power of the proposed model indicates that the

unique characteristics of physicians have a strong and statistically significant influence on physicians' usage intention.

This study adds to the body of knowledge on IT adoption models and sheds some new insights into technology acceptance models amongst healthcare professionals by finding unique factors affecting healthcare professional's intention to accept the CDS system. Moreover, with this understanding, managers and practitioners are in a better position not only to identify the source of resistance toward the new CDS but also to devise strategies to improve the overall acceptance of the system among healthcare professionals in a hospital setting.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi syarat untuk ijazah Doktor Falsafah

**Faktor Penerimaan Yang Mempengaruhi Keputusan Sistem Sokongan
Klinikal Dikalangan Professional Penjagaan Kesihatan Di Malaysia**

Oleh

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Pelbagai "Teknologi Maklumat Kesihatan" dalam bentuk teknologi maklumat klinikal telah ditubuhkan secara beransuran dalam industri kesihatan. Teknologi maklumat klinikal boleh dianggap sebagai alat kesihatan strategik untuk meningkatkan kualiti perkhidmatan kesihatan, kecekapan dan keberkesanan para profesional kesihatan di sektor kesihatan. "Pendukung Keputusan" (klinikal terutamanya digunakan untuk membantu para profesional kesihatan (seperti doktor dan pakar kesihatan) dalam membuat keputusan dan meningkatkan kualiti perkhidmatan kesihatan. Jika CDS sistem tidak sepenuhnya digunakan oleh ahli profesional penjagaan kesihatan, usaha dan pelaburan ini menemui kegagalan.

Terdapat kebimbangan ini mengenai penggunaan CDS di kalangan profesional penjagaan kesihatan di Malaysia. Namun begitu, faktor-faktor yang mempengaruhi perilaku para profesional kesihatan dalam penggunaan CDS ini masih belum jelas sepenuhnya.

Model penerimaan teknologi seperti UTAUT bukan sahaja khusus ditujukan kepada para professional kesihatan dan model ini tidak mengambil kira ciri-ciri unik para professional kesihatan serta ciri-ciri khas CDS. Ciri-ciri utama para professional kesihatan yang diambil kira dalam kajian ini termasuk: 1 – tahap kodifikasi pengetahuan dan penyebaran pengetahuan, dan 2 – panduan dan arahan yang dihasilkan oleh CDS dan tahap interaktiviti di antara para professional kesihatan dan sistem CDS.

Integrasi di antara ciri-ciri professional kesihatan dan ciri-ciri CDS akan memberikan pemahaman yang lebih baik kepada adopsi teknologi maklumat dalam konteks khusus amalan kesihatan. Untuk tujuan ini, versi asli UTAUT telah ditingkatkan dengan ciri-ciri keunikan doktor dan ciri-ciri khusus sistem CDS. Penelitian ini dengan demikian mencadangkan rangka model dari perspektif yang lebih luas dan bersepadu. Untuk mengesahkan rangka kerja yang dicadangkan 21 temu bual separa berstruktur dengan beberapa pakar-pakar dari pelbagai bidang telah dijalankan di hospital-hospital Malaysia. Di samping itu, satu kaji selidik telah digunakan untuk menilai model yang dicadangkan di kalangan 309 ahli profesional penjagaan kesihatan di Malaysia. Model persamaan struktur yang telah digunakan untuk menguji model dalam konteks ini. Keputusan kajian ini memberikan penekanan terhadap ancaman autonomi para professional, penglibatan doktor dalam membuat keputusan tentang perancangan dan pelaksanaan CDS serta proses instrumental kognitif (terutamanya kepentingan persepsi) dalam menentukan niat doktor untuk menggunakan sistem CDS. Keputusan empirikal menunjukkan kepentingan kuasa ramalan untuk niat adopsi dan peranan berpengaruh dari pembolehubah-pembolehubah penting. Model asal UTAUT dalam suasana EMR

dapat menjelaskan hanya 20% daripada varians niat perilaku sedangkan model yang dicadangkan dapat menjelaskan 47% daripada varians niat perilaku para professional kesihatan dalam persekitaran CDS. Kuasa penerangan model yang dicadangkan menunjukkan bahawa ciri-ciri keunikan doktor mempunyai pengaruh yang kuat dan signifikan terhadap niat penggunaan doktor.



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I certify that an Examination Committee met on November 1, 2011 to conduct the final examination of Graduate student on his or her Doctor of Philosophy thesis entitled " Factors Influencing Acceptance of Clinical Decision Support Systems (CDS) among Healthcare Professionals in Malaysia" in accordance with Universiti Putra Malaysia (Higher Degree) Act 1980 and Universiti Putra Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or any other institutions.

POUYAN ESMAEILZADEH

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