

# **Examining a Technology Acceptance Model of Internet Usage by Academics within Thai Business Schools**

**By**

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## DECLARATION

I, Napaporn Kripanont, declare that the PhD thesis entitled “Examining a Technology Acceptance Model of Internet Usage by Academics within Thai Business Schools” is no more than 100,000 words in length, exclusive of tables, figures, appendices, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Napaporn Kripanont..... Date.....March 2007

# ABSTRACT

Information Technology has been a significant research area for some time, but its nature has changed considerably since the Internet became prominent just over a decade ago. Many researchers have studied and proposed theories and models of technology acceptance in order to predict and explain user behaviour with technology to account for rapid change in both technologies and their environments. Each theory or model has been proposed with different sets of determinants and moderators and most of them have been developed in the U.S. It is therefore questioned whether the theories and models of technology acceptance that have been developed, modified, and extended in the U.S. can be used in other countries, especially in Thailand. It is also questioned whether there might be other determinants and moderators that also play important roles in this specific environment.

This thesis (1) reviewed literature in respect of nine prominent theories and models, (2) reviewed previous literature about IT acceptance and usage within four contexts of study, (3) investigated the extent to which academics use and intend to use the Internet in their work, (4) investigated how to motivate academics to make full use of the Internet in their work, (5) investigated to what extent using the Internet helps in improving academics' professional practice, professional development and quality of working life, (6) formulated a research model of technology acceptance regarding Internet usage by Thai academics, and (7) generated and validated the research model that best describes Thai academics' Internet usage behaviour and behaviour intention. These last two objectives represent the main focus of the thesis.

Questionnaire survey method was used to collect primary data from 927 academics within Business Schools in 20 Public Universities in Thailand. The survey yielded 455 usable questionnaires, with a response rate of 49%. Statistical analysis methods and Structural Equation Modelling with AMOS version 6.0 were used to analyse data.

The research model was formulated with five core determinants of usage and up to nine moderators of key relationships. It was then tested and modified, the final modified model evidenced by goodness of fit of the model to the data, explained 31.6% (Square Multiple Correlation) of the variance in usage behaviour in teaching ,

42.6% in usage behaviour in other tasks, 55.7% in behaviour intention in teaching and 59.8% in behaviour intention in other tasks.

From the findings, three core determinants: perceived usefulness, perceived ease of use and self-efficacy significantly determined usage behaviour in teaching. Two core determinants: perceived usefulness and self-efficacy significantly determined usage behaviour in other tasks. Finally, usage behaviour significantly influenced behaviour intention. In addition three moderators: age, e-university plan and level of reading and writing, impacted the influence of key determinants toward usage behaviour. Only two moderators: age and research university plan, impacted the influence of usage behaviour toward behaviour intention. The rest including gender, education level, academic position, experience and Thai language usage did not impact the influence of the key determinants toward usage behaviour and did not impact the influence of usage behaviour toward behaviour intention.

Consequently, the final modified research model which is called the “Internet Acceptance Model” or “IAM” has the power to explain and predict user behaviour in a Thai Business Schools environment. A thorough understanding of the model may help practitioners to analyse the reasons for resistance toward the technology and also help them to take efficient measures to improve user acceptance and usage of the technology.

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# **PUBLICATIONS ASSOCIATED WITH THIS THESIS**

## **Journal Article**

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## **Conference Paper**

Kripanont, N. and Tatnall, A. 2005 “Examining a technology acceptance model of Internet usage by academics within Thai business schools”, VU Research Conference, Victoria University, Melbourne, Australia.

## GLOSSARY OF TERMS

**Academic** A full-time member of the instructional staff of a university and may mean, or be used interchangeably with the word “teacher”, “lecturer”, “instructor”, or “faculty member”.

**Academic Work** A work that relates to teaching and teaching related tasks within the University such as teaching in classes, providing a personal web-base for facilitating teaching, preparing teaching materials, writing teaching documents or texts. Moreover, academic work also covers research and administration tasks.

**Attitude toward Behaviour** It is previous attitude of a person toward performing that behaviour. People think about their decisions and the possible outcomes of their actions before making any decision to be involved or not involved in a given behaviour.

**Autonomous Universities** These universities will be external to the government administrative system but still under the direct supervision of the Minister of Education in Thailand. This means that autonomous universities will have their own system of personnel administration, finance, academic affairs, and general management appropriate to their characteristics and missions. However, these universities will still receive financial support from the government.

**Behavioural Beliefs** It is the likely outcomes of the behaviour and the evaluations of these outcomes. These beliefs produce a favourable or unfavourable attitude toward the behaviour.

**Bootstrapping Procedure** A versatile method for estimating the sampling distribution of parameter estimates in AMOS.

**Bollen-Stine Bootstrap Method** The bootstrapping of AMOS incorporates the Bollen-Stine bootstrap Method which is used only for testing *model fit* under non-normality.

**Compatibility** The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of the receivers.

**Complexity** The degree to which an innovation is perceived as relatively difficult to understand and use. The complexity of an innovation is negatively related to its rate of adoption.

**Control Beliefs** These beliefs indicate whether the person feels in control of the action in question and they give rise to perceived behavioural control.

**Cross-Sectional Study** A research study for which data are gathered just once (stretched though it may be over a period of days, weeks, or months) to answer the research question.

**Culture** A collective programming of the mind which distinguishes the members of one group or category of people from another. Culture is also defined as “the complete way of life of a people: the shared attitudes, values, goals, and practices that characterize a group; their customs, art, literature, religion, philosophy, etc.; the pattern of learned and shared behaviour among the members of a group”.

**Culture Context** The macro environment in which the investigated user acceptance behaviour may occur and the specific organisation is located.

**Content Validity** An aspect of validity assessing the correspondence between the individual items and the concept through ratings by expert judges, and pre-tests with multiple sub-populations or other means.

**Construct Reliability** An aspect of reliability measuring the internal consistency of a set of measures rather than the reliability of a single variable.

**Construct Validity** An aspect of validity testing how well the results obtained from the use of the measure fit the theories around which the test was designed. In other words, construct validity testified that the instrument did tap the concept as theorised.

**Convergent Validity** It is synonymous with criterion validity and with correlational analysis, and is one way of establishing construct validity.

**Dependent Variable** It is a variable of primary interest to the study, also known as the criterion variable.

**Discriminant Validity** It is another way of testing construct validity. A measure has discriminant validity when it has a low correlation with measures of dissimilar concepts. In other words, discriminant validity reflects the extent to which the constructs in a model are different.

**Endogenous Latent Construct** A latent, multi-item equivalent to a dependent variable. It is a construct that is affected by other constructs in the model.

**Exogenous Latent Construct** A latent, multi-item equivalent of an independent variable. It is a construct that is not affected by any other construct in the model.

**E-university Plan** The acknowledgement of academics toward e-university plan (plan of the University to become an e-university in the future) may positively affect Internet usage of academics because they may prepare themselves for the future by changing their behaviour so as to increase the utilisation of the new communication technology (e.g. the Internet) compared with academics who did not acknowledge this plan. Therefore, the acknowledgement of e-university plan may impact the influence of determinants toward usage behaviour.

**Facilitating Conditions** The degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system.

**Ethics** In business research, ethics refers to a code of conduct or expected societal norm of behaviour while conducting research.

**Government Officers** Since Thai government has a policy to transfer all public universities and institutes to become Autonomous universities. Therefore government officers are those who worked before the policy was inaugurated.

**Habit of Reading and Writing** Since the national culture of Thai people tends to exhibit habits of not much reading and writing. This habit of Thai people sometimes does not encourage or support using the Internet. When someone uses the Internet it is essential to put effort especially into reading the information or occasionally writing (keying), for example when using email. Therefore, academic perception of whether their level of reading and writing are obstacles or not in using the Internet may impact on the influence of determinants toward usage behaviour.

**Independent Variable** A variable that influences the dependent or criterion variable and accounts for (or explains) its variance.

**Individual Context** Those essential characteristics of individual users that are related to technology usage. An individual may exhibit characteristics completely different from others in other organisations or from different cultures.

**Information Technology** Computer technology, both hardware and software, for processing and storing information, as well as communication technology including networking and telecommunications for transmitting information.

**Generalisability** The probability that the results of the research findings apply to other subjects, other groups, other settings and other conditions.

**Longitudinal Study** A research study for which data are gathered at several points in time to answer a research question.

**Parsimony (Measure of Parsimony)** A model high in parsimony (simplicity) is a model with relatively few parameters and relatively many degrees of freedom. On the other hand, a model with many parameters and few degrees of freedom is said to be complex or lacking in parsimony.

**Methods** The various means or techniques or procedures used to gather and analyse data related to some research question or hypothesis.

**Methodology** The strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes.

**Moderating Variable** The moderator or the moderating variable is one that has a strong contingent effect on the independent variable and dependent variable relationship. That is, the presence of a third variable (the moderating variable) modifies the original relationship between the independent and the dependent variables.

**Moderating Hypotheses** The hypotheses that will be tested for moderators .

**Multicollinearity** When the dependent variables are highly correlated this is referred to as multicollinearity.

**Non-Government Officers** Thai government has a policy to transfer all public universities and institutes to become Autonomous universities. So non-government officers are those new staff who began work in the Universities after the policy was inaugurated.

**Normative Beliefs** The perceived behavioural expectations of such important referent individuals or groups as the person's spouse, family, friends, and teacher, doctor, supervisor, and co-workers, depending on the population and behaviour studied. These beliefs result in perceived social pressure or subjective norm.

**Observability** The degree to which the results of an innovation are visible to others.

**Organisational Context** The specific environment where the individual works and the investigated technology acceptance takes place.

**Perceived Behavioural Control** It refers to people's perceptions of their ability to perform a given behaviour and it influences intentions.

**Perceived Ease of Use** The degree to which a person believes that using a particular system would be free of effort.

**Perceived Usefulness** The degree to which a person believes that using a particular system would enhance his or her job performance.

**Pilot Study** The study conducts to detect weaknesses in design and instrumentation and to provide proxy data for selection.

**Population** The entire group of people that the researcher wishes to investigate. In this research it is academics within Business Schools in the Thai Public University Sector who have already had experience in using the Internet.

**Pre-testing** A trial run with a group of respondents for the purpose of detecting problems in the questionnaire instructions or design, whether the respondents have any difficulty understanding the questionnaire or whether there are any ambiguous or biased questions.

**Questionnaire** A pre-formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives.

**Relative Advantage** The degree to which an innovation is perceived as being better than the idea it supersedes, the degree of relative advantage is often expressed in economic profitability but the relative advantage dimension may be measured in other ways (e.g. social).

**Reliability** The extent to which research findings would be the same if the research were to be repeated at a later date, or with a different sample of subjects.

**Research University Plan** The acknowledgment of academics toward the research university plan may impact on the influence of determinants on usage behaviour compared to academics who have not acknowledged this plan. Academics who have acknowledged this plan might prepare themselves for the future, for example by trying

to use communication technologies (e.g. the Internet) to search for information for their research. On the other hand, academics who have not acknowledged this plan may concentrate only on teaching and not pay any attention to research.

**Sample** A sample is a subset of the population, comprising some members selected from the population.

**Self-Efficacy** An individual's self-confidence in his/her ability to perform a behaviour.

**Square Multiple Correlation** It is used to measure the construct reliability. The square multiple correlation (SMC) is referred to an item reliability coefficient. It is the correlation between a single indicator variable and the construct it measures. In other words, SMC is the proportion of its variance that is accounted for by its predictors.

**Social Influence** The degree to which an individual perceives that other important persons believe he or she should use the system.

**Structural Equation Modelling** A multivariate technique combine aspects of multiple regression (examining dependence relationships) and factor analysis (representing unmeasured concepts-factors with multiple variables) to estimate a series of interrelated dependence relationships simultaneously.

**Subjective Norm** The social pressure exerted on the person or the decision maker to perform the behaviour. It refers to an individual's perception about what other people think of his or her behaviour in question.

**Technology Context** It is the end-user computing technologies under investigation, such as any IT innovations, information system applications, and communications technology.

**Thai Language** The first or national language of the Thai people and it is one of the layers of culture and it is different to the main Internet language which is normally English. Moreover, databases developed in the Thai language are still not sufficient to support the demands of the Thai people especially in higher education.

**Theoretical Framework** A collection of theories and models from the literature which underpins a positivistic research study. It is a conceptual model of how the researcher theorises or makes logical sense of the relationships among the several factors that have been identified as important to the problem. The theoretical framework may be referred to as a conceptual framework or as the research model. These three terms are used interchangeably in this research.

**The Internet** A publicly available computer network consisting of a worldwide network of computer networks that use the TCP/IP network protocols to facilitate data transmission and exchange, its synonyms are cyberspace and Net.

**Trialability** The degree to which an innovation may be experimented with on a limited basis.

**Validity** The extent to which the data collected truly reflects the phenomenon being studied.

**Wireless Fidelity** A set of standards for wireless local area networks (WLAN) and provides wireless access to the Internet.

# LIST OF ABBREVIATIONS

AGFI	Adjusted Goodness-Of-Fit Index
AM	Alternative Model
AMOS	Analysis of Moment Structures
ARPA	Advanced Research Projects Agency
ATB	Attitude Toward Behaviour
BI	Behaviour Intention
BITEACH	Behaviour Intention in Teaching
BIOTASK	Behaviour Intention in Other Tasks
CFI	Comparative Fit Index.
C-TAM-TPB	Combined TAM and TPB (Augmented TAM)
DF	Degree of Freedom
DTPB	Decomposed Theory of Planned Behaviour
EM	Expectation Maximisation
FC	Facilitating Conditions
GFI	Goodness- of- Fit Index
IT	Information Technology
ICT	Information and Communication Technology
IDT	Innovations Diffusion Theory
IAM	Internet Acceptance Model
IETF	Internet Engineering Task Force
IRC	Internet Relay Chat
LANs	Local Area Networks
ML	Maximum likelihood
MG	Model generating
MAR	Missing At Random
MCAR	Missing Completely At Random
MM	Motivational Model
MPCU	Model of PC utilization
N	Population
n	Sample Size

NSF	National Science Foundation
NECTEC	National Electronics and Computer Technology Centre
NFI	Normed Fit Index
OTASK	Usage Behaviour in Other Tasks
PBC	Perceived Behaviour Control
PEOU	Perceived Ease Of Use
PU	Perceived Usefulness
PD	Professional Development
PP	Professional Practices
RFCs	Requests for Comments Documents
RMSEA	Root Mean Square Error of Approximation
SC	Strictly Confirmatory
SCT	Social Cognitive Theory
SE	Self-efficacy
SI	Social Influence
SMC	Squared Multiple Correlations
SEM	Structural Equation Modelling
SN	Subjective Norms
TAM	Technology Acceptance Model
TAM2	Technology Acceptance Model 2
TEACH	Usage Behaviour in Teaching
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
TCP/IP	Transmission Control Protocol/Internet Protocol
TLI	Tucker-Lewis coefficient Index
ULS	Unweighted Least Squares
UTAUT	Unified Theory of Acceptance and Use of Technology
WANs	Wide Area Networks
WWW	World Wide Web

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Among millions of people one may not have known so many people in one's life. A few people that we have met are family, relatives, friends and other important people. It is always my belief that being in company with the "Wiseman" who has good merit is a blessing for one's life. We will never forget that once in our life we have a good chance to meet these "Wise Beings". Sometimes the words "Thank you very much" are not enough for their kindness in trying to help one pass the obstacles to the goal that one wants to achieve.

Studying for a PhD is like a long journey in sailing a ship across the ocean. It was necessary to put much of your effort, concentration, endurance and patience until the end of your journey; sometimes you do not know when! Even though we intended to cross the ocean, during this long journey anything could happen and may affect your determination. Without help and support from many people around you it may not be possible to finish your journey, your ship may become a wreck and sink to the bottom of the ocean. I would like to acknowledge these people, who I met as the "Wise Beings", who not only have they high knowledge but also have given their good merits to other people that related to them.

I have always been very grateful when I remembered a story about one who has the "Great Spirit" with strong determination, great patience, great loving, great compassion, great generosity, and great willingness to help people that one associated with. I would like to tell this story which is the best story for me in motivating me in many respects in viewing and living with people around me.

A long time ago in the past, somewhere in the thick forest, raining and a heavy storm caused trouble to a squirrel family. Three children were separated from their father and were swept away into the sea. With his great love, he intended to take his babies back by draining the sea water out to find his children. He ran to the beach and used his tail to absorb the sea water and run back to the land, shaking his tail to get rid of the water. He did this thousands of times until seven days passed. He was so tired and could hardly move, but he still intended to continue helping his children.

At that time, the greatest angel in heaven felt disturbed by sensing the hardening of his comfortable seat. It became hard and did not ease to sit. It was a sign of a good living creature that was in trouble. The greatest angel looked upon the human world and saw the father squirrel. He managed to face the father squirrel and said “You are very stupid to do this because the sea never gets dry thus you could not help your children anyway.” The father squirrel replied “You are the one that is so stupid not me” “I don’t want to waste my time to talk with you – go away”. The greatest angel knew that he could never change the squirrel’s mind so he decided to help by taking three children from the sea alive and gave them to their father!

In the real world, there are a lot of good people who are very kind to other people just like in this story. I would like to express my gratefulness to these people. My thesis would not have been possible without these people.

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Dr Arthur Tatnall is my principal supervisor. He is an associate professor in the School of Information Systems. He is the most important person that helped me to overcome many difficulties during my study. Not only does he have good experience and knowledge in the field of Information Systems but he has also given his kind support and always encouraged me to continue my study any time that I felt a bit down. When there was anything I did not know he has been very willing to help by spending times, efforts, and especially his patience. It is my great honour to be his student. I am extremely grateful to Dr Arthur Tatnall for his great generosity in supporting me in my study.

I remembered a saying that “It is a blessing for anyone who has a teacher that is a person of high intelligence and who is high knowledgeable in various academic aspects”. Because of this I am very proud of my two supervisors since I knew that they both graduated from a good University with a Bachelor degree of Physics. In my opinion Physics is one area that is very difficult to study.

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My mother is always being there whenever I have a problem. She always pushed me to study at this level. Although she is rather old she still works very hard to take care of everything during my absence to study in Australia. However, despite the fact that she wanted me to graduate at this level she always complained to me and requested me to go back because she was very tired of taking care of everything on my behalf.

My dearest father had given great support since I was young. When I was around four years old he asked me whether I wanted to go to school yet. When I said “Yes” within a few days he brought me to the school during the semester after other students had already attended the school for a month (I still remembered that day). During my study in high school, he always bought me many external books in order to help me to practice in many difficult subjects. I remembered one day he gave me a set of maps of the world from the U.S. which showed the geographical appearance of each continent. They were very beautiful in colour and I could view and touch where there was a mountain and where there was a river. In that year I got a full score in the Geographic subject because I could remember everything by pictures. If he was still alive, I have no doubt that he would support me one way or another during my study at this level.

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