

A Theory-based Model for the Study of Executive Information Systems Adoption by the Top-level Managers

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Abstract

In recent years, a number of organisations have invested heavily in executive information systems (EIS) in order to improve the performance gains of their executives' roles. Although executives presided over and authorised investment in EIS projects to support their roles, the majority of executives are unenthusiastic about using EIS because of the design flaws and failures of these systems. Studies by Nandhakumar and Jones (1997), McBride (1997) and recently Ditsa (2003) have suggested that the root of the success or failure of EIS can be attributed to social, cultural and organisational factors rather than technical factors alone. To address the problem of the low use of EIS by executives, we use social factors, habits and facilitation conditions from Triandis' (1979) framework to extend the Technology Acceptance Model (TAM). The model hypothesises that executives' behaviour positively relates to facilitating conditions, habits and social factors. This paper is a significant contribution to management practice and academic literature.

Keywords: EIS, Cultural, Social, Theoretical foundation, Underutilisation

1. Introduction

The key development of new information technology has been the spread of the use of executive information systems (EIS) by executives whose decisions must be made in an increasingly competitive and uncertain environment (Bergeron et al, 1995). EIS can be defined as, "a computer-based system that serves the information needs of the top executive. It provides rapid access to timely information and direct access to management reports. It is user-friendly supported by graphics, exceptional reporting and "drill-down" capabilities. It is connectable to on-line information services and electronic mails" (Turban 1993, p. 394). EIS can be implemented at the corporate level or divisional level and focus on any specified business function (Bergeron et al, 1995; Young and Watson, 1995). EIS software includes Crystal Reports, Cross Target and Cognos PowerPlay. The main aim of EIS is to bring information from the external environment and all parts of an organisation and present it in a way that is meaningful to executive users (McBride, 1997; Ikart and Ditsa, 2004 a, 2004b).

To improve the performance gain of executives' roles, a significant number of organisations have invested heavily in EIS. Recent development in EIS software indicates that even small firms are getting involved in EIS efforts (Bajwa et al, 1998). Although executives presided over and authorised investment in EIS to support their roles (Fitzgerald and Murphy, 1994; Thodenius, 1995; McBride, 1997) the majority of executives are unenthusiastic to use EIS because of the design problems and failures of these systems. According to Thodenius (1996), the actual use/value of EIS by the top-level officers is very small.

In recent years, the use of EIS in organisations has spread to additional managers at various levels (Vlahos et al, 2000; Singh et al., 2002). Although this spread has given EIS new names such as enterprise information system and business intelligent (BI) software and Balanced Scorecard (Liang & Miranda, 2001), the problem of their underutilisation by executives remains unresolved. Fitzgerald and Murphy (1994) for instance examined the usage of EIS at organisational levels in the United Kingdom and found that only 32% of EIS users were at the executive level while the majority (68%) users were at the middle management level. Their finding was confirmed by a further study by Fitzgerald (1998). This finding suggests a higher degree of EIS usage at the middle management level than the strategic management level, which is the level the system supposed to serve. According to Basu et al, (2001) the diffusion of EIS down the organisational hierarchy is the only growth direction in terms of numbers of users. As a result, they questioned the diffusion of EIS. "If EIS usage diffuses to the middle management level is it still an "EIS"? (Basu et al, 2001 p. 274). To summarise, "Top officers don't use executive information systems" (Wildt, 1991 p. 38).

According to Garr (2003), companies around the world spend more than two trillion dollars annually on IT infrastructures. The US market in IT comprises approximately 50% of its business capital (Garr, 2003). Their investment in EIS across all sectors in the US in 2003 accounted to approximately US\$5 billion (Liang & Miranda, 2001). In 2002, the Spanish market in EIS was growing at approximately 37.5% (Salmeron, 2002). The growth of EIS can be attributed to two of their primary benefits to users. First, it is believed that EIS have a significant impact on executive productivity (Kelly, 1994, Watson et al, 1997). By providing on-line easy and faster access to internal and external information, EIS facilitates a better understanding of the business and greatly reduce response in decision-making situations (Rockart and De Long, 1992). Second, EIS can have a tremendous impact on a firm's planning and control systems as they can lead to realignment of reporting systems, changes in forecasting processes, and improvements in projects management capabilities (Rockart and De Long, 1992; Bajwa et al, 1998) such impact can actually lead to organisational effectiveness (Paller and Laska, 1990). However, despite the growth and potential benefits of EIS, their underutilisation by executives remained a major concern to user organisations.

Approximately 60% of organisations invested in EIS in the US have experienced a significant failure of the systems (Watson and Rainer, 1995). The failure of EIS was estimated as high as 70% (Poon and Wagner, 2001). These failures have been attributed to social, cultural, organisational and psychological factors rather than technical factors alone. Due to this failure, a number of researchers (e.g., Davis, 1993; Young & Watson, 1995; Mao, 2002) have investigated organisational and technological factors that determine user acceptance of IS including EIS. Although these research efforts have provided some valuable results, they have been constrained by lack of appropriate reference theoretical foundation and variables for key determinant of user acceptance and use of IS including EIS.

In their investigation of utilisation as a key dependent variable in most streams of IS research (e.g., DSS, MIS, end-user computing), Trice and Treacy (1988) asserted that, as a behaviour whose determinants are not well understood in IS research, system use can best be explained by referring to an appropriate reference theory. Further, Kling (1991) who studied the social impact of human computer argued that, "in order to identify the social impact of computing one must have at least implicitly a theory of causal power that computerised systems can exert upon individuals, groups, organisations, institutions, social networks, social world and other social entities" (p.151). These assertions have guided several researchers (e.g., Mao, 2002; Bergeron et al, 1995; Ditsa, 2003; Money and Turner, 2004). Pursuing these assertions,

together with a thorough assessment of the theoretical perspectives used in the IS research, this paper employed TAM and Triandis's framework as a theoretical foundation. The paper used TAM as the basis and incorporated Triandis' framework variables – *habits, social factors* and *facilitating conditions* as the extension to derive the research model to investigate and examine the social, cultural, individual and organisational factors that could explain the behaviour of executives towards the adoption and usage of EIS in organisations.

The motivation of this paper is due to the realisation that there is a marked limited research on the actual use of EIS by executives and lack of appropriate reference theoretical foundation of individual, organisational, social and cultural variables in determining key factors that influence user acceptance and use of EIS in organisations.

The potential contribution of this paper is the research model and the theoretical foundation, which provides a future direction for better understanding of the choices of executives in using EIS. We believe that future findings based on the model will assist EIS developers to understand the core information processing requirements for executives' tasks for which they are building an EIS in order to implement appropriate system functionalities to support those tasks. Theoretically, the framework and research model will assist researchers to further explain human behaviour towards IS including EIS adoption and usage. Next, the research model can be applied in other social science research including E-commerce, Internet banking and marketing areas.

The remainder of this paper is organised as follows; first, we present some theoretical perspectives in IS research and the theoretical foundations (TAM instrument and selected variables from Triandis' framework – habits, facilitating conditions and social factors) used for this paper. Second, we present previous studies on EIS usage. Third, we present the research model followed by the implications from empirical studies. Finally, we present the conclusions of the paper and suggestions for future direction.

2. Theoretical Perspectives in IS Research

In the past few decades, IS acceptance issues have been extensively studied. In contrast to earlier studies (e.g., Young and Watson, 1995; Poon and Wagner, 2001), which lacked theoretical foundation, more recent studies focus on theory-based models to investigate the factors that could explain individual's reactions to computers. Candidates among these theories include: Task Technology Fit model (e.g., Dishaw & Strong, 1997); Variance Theory and Process Theory (e.g., Seeley & Targett, 1999); General System Theory (e.g., Raisinghani & Schkade, 1979); Diffusion Theory (e.g., Mao, 2002); The Theory of Plan Behaviour (Mathieson, 1991; Taylor & Todd, 1995) and Activity Theory (e.g., Verenikina & Gould, 1997; Hasan & Gould, 2001).

These theories have been acknowledged in the IS research because they enable researchers to gain a useful insight into the reaction of people towards computers and factors enabling the reactions. For instance, the Task-Technology Fit Model aims to match the capability of the technology to the demand placed on the technology in a work environment (Dishaw & Strong, 1997). Moreover, the Theory of Plan Behaviour (TPB) incorporates the notion of perceived behavior control (PBC) as an independent influence on behaviour, recognising that there are circumstances in which a behaviour might be expected to result in positive consequences (or net benefits), yet not be undertaken due to a perceived lack of ability to control the execution of behaviour (Mathieson, 1991; Taylor & Todd, 1995). Further, Activity Theory aims to explain the connection between human psychology and computer

interface design in a social work environment. As a result, this theory establishes the relationship between human computer interactions and computer interface design by taking into consideration the context of the work environment (Verenikina & Gould, 1997; Hasan & Gould, 2001)

None of the above theories examine explicitly organisational contextual factors such as cultural, social and organisational variables that can explain executives' behaviour towards EIS adoption and use because of their insufficient variables. TAM (Davis, 1993; Davis 1989), an intention based model derived from The Theory of Reasoned Action (TRA) (Fishbein, 1979) has been used as a theoretical foundation to explain IS acceptance and usage (e.g., Davis, 1993; Mao, 2002). Further, Triandis'(1979) framework employed in some previous studies (e.g., Bergeron et al., 1995; Ditsa, 2003) can address explicitly the social, cultural and organisational factors that can influence the behaviour. TAM and Triandis' framework have separately guided researchers (e.g., Davis 1989; Dishaw & Strong, 1997; Mao; Bergeron et al, 1995; Ditsa, 2003; Venkatesh et al, 2003; Money & Turner, 2004, Ikart and Ditsa, 2004a, 2004b) to explain human behaviour towards computer adoption and usage. This paper uses original TAM developed by Davis (1989) and Triandis'(1979) framework as the theoretical foundation. The paper extends TAM with such variables as habits, facilitating conditions and social factors from Triandis' framework to derive the research model suitable in explaining the factors that can influence the adoption and usage of EIS by executives.

3. Research Studies on EIS Usage

Past studies on EIS usage can be broken into five areas as follows: (i) *Factors influencing and explaining use*, (ii) *Overall benefits from EIS*, (iii) *Pattern of use and frequency of use*, (iv) *Impact of EIS on managerial activities*, and (v) *Emergence of EIS*. In the classifications below (Table 1), the majority of research on EIS has been exploratory instead of theory testing. Only a limited number of studies (e.g., Bergeron et al., 1995; Ditsa, 2003) in research area (i) as per Table 1 employed appropriate reference theories to gain insight into factors influencing the actual engagement of EIS by senior managers. Without appropriate reference theories, it may be impossible to realise the importance of the other four research areas.

<u>Research Areas</u>	<u>Reference</u>
i. <i>Factors influencing/explaining EIS use</i>	Young & Watson, 1995; Rainer & Watson, 1995; Bergeron, et al, 1995; Poon & Wagner, 2001; Singh et.al., 2002; Ditsa, 2003.
ii <i>Overall benefits from EIS</i>	Kelly, 1994; Nord & Nord, 1995; McBride, 1997; Nandhakumar and Jones, 1997.
iii <i>Patterns of use & frequency of use</i>	Seeley & Targett, 1999; Thodenius, 1996, 1995
iv. <i>Impact of EIS</i>	Rockart and DeLong, 1992; Laidner & Elam, 1994; Liang & Miranda, 2001; Kumar & Palvia, 2001; Salmeron, 2002.
v. <i>Emergence of EIS</i>	Rockart & Treacy, 1992; Houdeshel & Watson, 1987. Fitzgerald & Murphy, 1994; Fitzgerald, 1998.

Table1: Classifications of EIS Usage Research Studies

McBride (1997) studied the progress of an EIS project within a manufacturing organization in the United Kingdom over a 9-year period. His study demonstrates the importance of the interaction between the business environment, the organisational environment and the perceptions and interpretations of events by stakeholders on the success or failure of EIS. Furthermore, it illustrates the importance of the organisational context and the dynamic nature of the social, economic and technical factors critical in shaping acceptance and use of EIS in organisations.

Moreover, Nandhakumar and Jones (1997) witnessed an EIS development project in their in-depth study of the development methods in organisation where potential executive users were not involved in the design phases. As a result, their study suggests that there should be better theoretical conceptualisation of the dynamic relationship between the developers and executives to assist in understanding how the relationship shapes, and is shaped by various constraints.

Studies of the Stock Exchange Taurus system (e.g., Currie, 1995), the London Ambulance system (e.g., Beynon-Davis, 1995), the Confirm system (e.g., Oz, 1994) and other (e.g., Sauer, 1993; Mitev, 1996) cited in McBride (1997) further demonstrate the importance of the complex interaction of social, cultural and other contextual elements that resulted in a failed IS. Equally, IS success depends on more than technical competence (McBride, 1997).

The above studies suggest that the roots of the success or failure of IS including EIS can be attributed to social, cultural and organisational factors and not technical factors alone.

4. Technology Acceptance Model (TAM)

A body of research into an accumulated knowledge of the factors affecting IS acceptance has as its foundation from TAM, a model originally conceived by Davis in 1986. Davis developed TAM to explain human computer-usage behaviour using Fishbein and Ajzen's (1975) TRA as the theoretical basis. The objective of TAM is to provide an explanation of the determinants of computer acceptance that is capable of explaining the behaviour of users across a broad range of end-user computing and user populations while simultaneously being parsimonious and theoretically justified (Davis, 1989). TAM uses TRA to specify causal linkages between two relevant sets of beliefs, the perceived usefulness (PU) and the perceived ease of use (PEOU), to attitude towards using (ATU), behavioural intention (BI) and actual computer usage behaviour (A). In other words, Davis conceived that TAM's beliefs – attitude – intention – behaviour relationship predicts user acceptance of IS.

Davies et al, (1989, p. 320) define PU as the user's "subjective probability that using a specific application system will increase his/her job performance within an organisation context". Davis defines PEOU as "the degree to which an individual believes, that using a particular system would be free of physical and mental effort" (Davis, 1993 p. 447). While PEOU relates to the assessment of the intrinsic characteristics of IT such as ease of use, ease of learning, flexibility and clarity of its interface, PU on the other hand is a response to user assessment of its extrinsic, i.e., task-oriented, outcomes: how IT helps users achieve task-related objectives, such as task efficiency and effectiveness (Gefen & Straub, 2000). According to TAM both PU and PEOU influence individual's attitude towards using computers. PU and attitude influence the behaviour intention to use the system. Actual system use is predicted by the behaviour intention.

According to Davis (1986), TAM is based on the TRA attitudes paradigm which specifies how behaviour relevant components of attitudes can be measured, distinguishes between beliefs and attitudes and specifies how external stimuli such as objective features of attitude object, are causally linked to beliefs, attitudes and behaviour. In their study, Fishbein and Ajzen (1975) draw the distinction between two attitude constructs such as attitude towards the object and attitude towards the behaviour. The former refers to individual's effective evaluation of a specified attitude object and the later refers to an individual's evaluation of a specified behaviour involving the object. Based on prior studies (e.g., Davis, 1986, 1993) attitude towards the behaviour relates more strongly to a specified behaviour than attitude towards the object (Davis, 1986, 1993). Within the present paper attitude towards using EIS (behaviour) is used. Arrow in TAM (Figure1) below indicates the direction of causality.

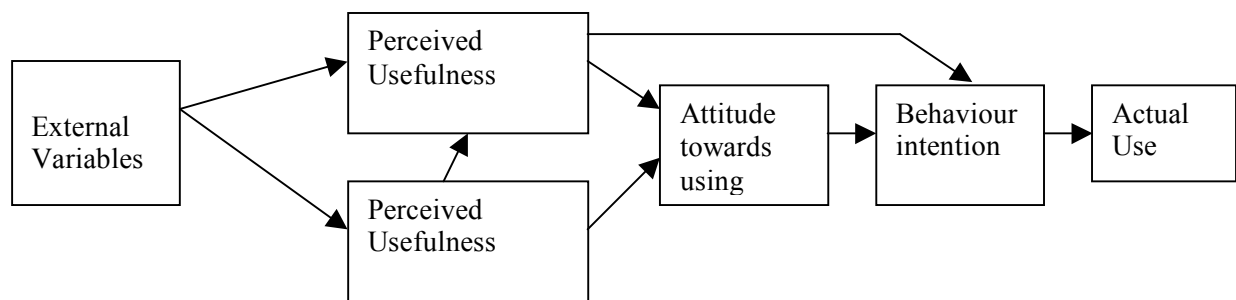


Figure 1: Technology Acceptance model (Source: Davis, 1993 p.476)

TAM cuts a wide theoretical swath, which includes the adoption of innovations, the cost-benefit paradigm, expectancy theory, and self-efficacy theory (Davis, 1989). A review of scholarly research on IS acceptance and usage suggests that TAM has emerged as one of the most influential models in this stream of research (Davis et al, 1989; Robey, 1996) including e-commerce and the adoption of Internet technology (e.g., Gefen & Straub, 2000). TAM with its original emphasis on system design characteristics represents an essential theoretical contribution in understanding IS usage and acceptance behaviours (Davis et al, 1989). For instance, Davis (1989) originally examined an email system and file-editor used at the time at IBM Canada and found the PEOU and PU of TAM to be significantly correlated with self-reported use of the system. Further, evidence of the research community's growing acceptance of TAM is reflected in the fact that the Institute for Scientific Information Social Science Citation Index recently listed 335 journal citations since 1999 of the initial research paper published by Davis et al 1989. More than ten years after its original publication, TAM continues to receive heavier use than when compared to earlier data by Venkatesh and Davis in 2000 (Money and Tuner, 2004).

TAM has been replicated and tested extensively to provide empirical evidence on the relationship that exists between PU, PEOU and A (e.g., Davis et al, 1989; Adams et al, 1992; Segars and Grover, 1993; Hendrickson et al, 1993; Szajna, 1994). The sum of this study has confirmed the validity and reliability of Davis' instrument, and to support its use with different populations of users and different software choices. Further, TAM uses multiple-item scales to operationalise ATU, PU and PEOU in order to measure these constructs more reliably than would be possible with single-item scales. The Crobach alpha reliability of TAM scales has been found to exceed 0.9 across numerous studies (e.g., Davis, 1993; Davis and Venkatesh, 1996). In addition, TAM item scales exhibit a high degree of discriminant, convergent and nomological validity (e.g., Davis and Venkatesh, 1996 Davis, 2001). The

importance of these psychometric properties and the high proportion of variance in ATU to actual system use explained by PU and PEOU have led to confidence in TAM for studying IS adoption (Davis, 1993; Davis and Venkatesh, 1996; Davis, 2001).

However, there are potential biases in TAM. One of the major biases in TAM is that TAM assumes when someone forms an intention to act, that they will be free to act without limitation. In the real world, there will be many constraints such as limited ability, time constraints, environmental or organisational limits and subconscious habits, which can limit individual freedom to act (Bagazzi et al, 1992). TAM with its original emphasis on the system design characteristics does not account for social norms, subconscious habits and facilitating conditions of the organisational environment in the adoption and utilisation of new IS including EIS (Davis, 1986, 1989; Davis et al, 1989; Davis and Venkatesh, 1996).

Another major potential concern in TAM is the high reliability and validity of the TAM scales and the large proportion of variance in intention explained by perceived usefulness and ease of use that could simply be an artifact of the measurement approach, which groups together multiple items measuring a single construct. Several empirical studies (e.g., Bradburn, 1982; Budd, 1987) cited in Davis (1996) have demonstrated that the psychometric properties of measurement scales can be affected by ordering of items within the questionnaire. Classical psychometric theory does not explicitly account for these “context” effects (Davis, 1996).

Furthermore, most of the existing studies on TAM were conducted in North American countries (e.g., Davis 1986; Davis et al, 1989; Vijayasarathy, 2002). When TAM is tested in other countries such as Switzerland (e.g., Straub et al, 1997), Japan (e.g., Straub et al, 1997) and Jordan (e.g., Sukker and Hansan, 2004) the results vary on TAM predictive power. Cultural, social norms, habits and facilitating conditions have been suggested to play an essential role in explaining different patterns in individual IS adoption (Thompson et al, 1991, Bergeron et al, 1995; Staub et al, 1997; McBride, 1997; Ditsa, 2003; Zakour, 2004; Ikart and Ditsa, 2004a, 2004b).

Davis et al (1989) and Davis (1986) realised that the omission of a subjective norms from TAM represents an important area that requires further investigation. They observed that the theoretical basis of TRA makes it difficult to distinguish if behaviour is caused by the influence of referent on one’s intent or by one’s own attitude. Davis (1986) noted that “the subject may want to do what Referent X thinks he/she should do, not because of X’s influence, but because the act is consistent with the subject’s own [attitude]”. Not only did Davis and Davis et al underscore the effect of social norms they failed to recognise the importance of habits and facilitating conditions explained by Triandis’ (1979) to influence the behaviour. However, their studies have highlighted the importance of developing knowledge from TAM. This paper uses TAM as the basis and incorporates social factors, habits and facilitating conditions from Triandis’ framework as an extension to derive the research model that can explain executives’ behaviour towards EIS adoption and usage.

4.1 Triandis’ Theoretical Framework

Triandis (1979) presents a theoretical framework with central themes which focus on the relationships of values, attitude, and other acquired behavioural dispositions to action or behaviour. The framework pulls together the relationship involving these concepts. The variables used from Triandis’ framework in this paper are: *Social factor*, *Habits* and *Facilitating conditions*. This paper examines this subset of Triandis’ framework only. For a

thorough discussion of the model and its 34 hypotheses, the reader should refer to Triandis (1979) in *Nebraska Symposium on motivation: beliefs, attitudes and values*.

Habits: Triandis defines habits as “situation-behaviour sequences that are or have become automatic such that they occur without self-instruction” (p. 204). Habits are closely linked to an individual’s past experience and ability to perform a given act. Triandis’ model suggests that in addition to intention habitual nature of a behaviour will have a significant influence on individual response to a given situation. Further, he argued that habits are more important than intention for many behaviours.

Facilitating conditions: He defines facilitating conditions as “objective factors which are out there in the environment such that several judges or observers can agree make an act easy to do” (p. 205). *Acts* he says are socially defined patterns of muscle movements. Triandis states that behaviour cannot occur if the objective conditions of the environment prevent it.

Social factors: Triandis says that personality internalises the cultural way of perceiving the social environment, called the subjective culture of the group. The subjective culture consists of: *norms* (self-instruction to do what is perceived to be appropriate by members of the culture in certain situations; *value* (the tendencies to prefer a state of affairs over others; *roles* (appropriate behaviour by a person holding an office in a group) and, *social situation* (a behaviour setting where more than one person is present). The internalisation of a cultural Triandis says forms the social factors that influence the intention to behave.

Triandis’ framework is recognised in social psychology as an important model in studying human behaviour. Although the model is very complex and less often used in the IS research domain, findings from previous IS studies (e.g., Thompson et al, 1991; Bergeron et al, 1995; Ditsa, 2003) based on Triandis’ framework demonstrate the importance of the model in understanding people reaction to IS including EIS. Further, the sum of this study has confirmed the validity and reliability of Triandis’ framework variables and to support it use in explaining individual behaviour towards computer adoption. We present the research model in the next section.

5. Research Model

The research model (Figure 2 below) is based on TAM whose root is TRA (Fishbein and Azjen, 1975), plus the extension derived from such variables as habits, social factors and facilitating conditions from Triandis’ framework. Although TAM, the basis of our model emerges as the most practical and simplistic model in explaining individual’s IT including EIS adoption, TAM is constrained by a lack of antecedents such as organisational environment, social norms and subconscious habits, which limit individual freedom to act. Due to these issues and the fact that individuals’ behaviour is often conditioned by their culture, we develop an extended model that accounts for habits, facilitating conditions and social factors.

We feel that substantive development may continue to elude the EIS user community unless the factors mentioned above that limit improvement in the adoption and use of EIS by the executives are addressed. Until this is achieved organisations will continue to experience the low use of EIS by executives because the conventional TAM and other theoretical perspectives discussed previously are of limited applicability in this direction. Again, it is in the light of this that we offer what we believe is a more appropriate model for computer including EIS adoption and usage by the users. The model hypothesises that: habits,

facilitating conditions and social factors positively relates to behaviour. Similar to Davis (1993), behaviour intention is not included in the research model.

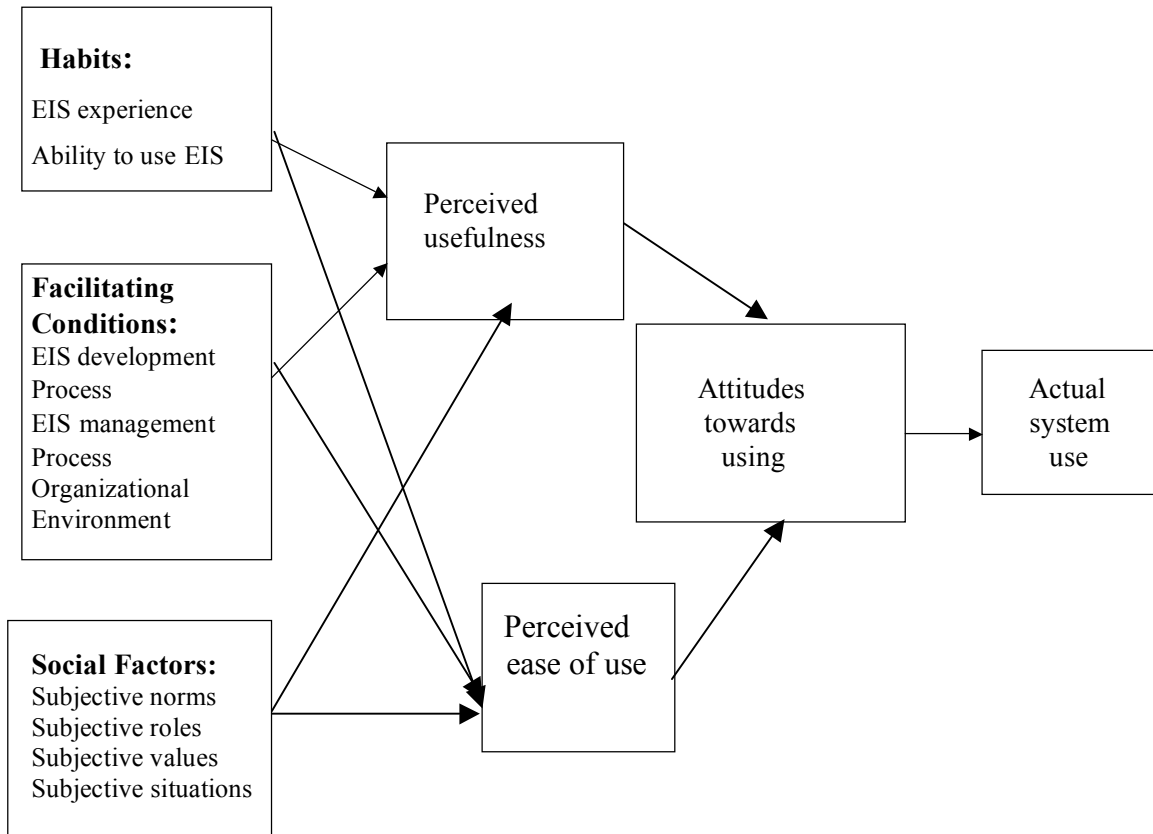


Figure 2: The Research Model

5.1 Implications of the Model from Empirical Studies

We acknowledge *habits* as the determinant of behaviour using executives' *EIS experience* and *the ability to use EIS* as the proxy. In other words, habits are operationised based on the number of years of executives' experience in EIS and their ability to use EIS. We claim that executives who had been using EIS applications for a greater length of time will have favourable attitudes in terms of users' comprehensiveness and participation (Bergeron et al, 1995; Ditsa, 2003). In the same vein their length of use will be positively related with behaviour by means of perceived usefulness and perceived ease of use (Bergeron et al, 1995). Hubona and Jones (2002) studied user acceptance of emailing and found that length of time since first use and level of education directly influence email usage behaviour by means of PU and PEOU. According to Lucas (1978), less educated individuals have more negative attitudes in using computers than individuals with better education. Education is effective in overcoming negative attitudes towards computers (Harrison and Rainer, 1992). Further, finding by Sugar (1967) of cigarette smoking *habits* by college study cited in Thompson et al, (1991) suggest that frequent and repetitive past behaviour (*habits*) would highly correlate with current behaviour.

In the context IS use, *facilitating conditions* can be theorised in terms of the provision of support for users of EIS to influence system use. This support could be hotline help, user training and other assistance given to users to counter any difficulties or barriers experienced

by them towards the system (Thompson et al, 1991; Bergeron et al, 1995). However, this paper operationalises facilitating conditions based on the degree of the *EIS development processes, EIS management processes and organisational environment* of EIS (Ditsa, 2003).

Triandis (1979) argued that facilitating conditions would be positively related to behaviour. He further explained that behaviour would not occur if objective factors (facilitating conditions) of the situation prevent it. Research efforts on EIS development (e.g., Watson et al, 1991) have sought to understand the factors contributing to the cost-effectiveness of EIS projects in organisations. Findings have linked this research to factors such as general top management support, committed executive sponsorship, management of user resistance and expectations, users' involvement and participation in the development and linking of the EIS project to business objectives (Watson et al, 1991; Nandhakumar & Jones, 1997; McBride, 1997). Also, research efforts on EIS management have linked it to such factors as the established management policies and rules for the systems, strategic data management on EIS, availability of user support group on EIS and the availability and accessibility of information on EIS (Ditsa, 2002, 2003; Ikart and Ditsa, 2004a, 2004b). With regards to organisational environmental factors for an EIS adoption, findings from previous studies (McBride, 1997; Ditsa, 2002, 2003; Ikart and Ditsa, 2004a, 2004b) have linked it to such factors as the dynamic change of the business environment, influence of the organisational culture on EIS project, interaction of the EIS with other systems between business units and, organisational commitment to wide use of EIS. This suggests that EIS development processes, EIS management processes and organisational environment will be positively related behaviour.

Furthermore, the *social factors* consist of *subjective norms, values, roles and social situation variables*. An internalisation of a particular culture forms the social factors of the group that influence intentions to behave (Triandis, 1979). It is claimed that behaviour in a cultural setting is more or less influenced by the social norms (Triandis, 1971), which depend on messages received from others and reflect what an individual thinks they should do rather than an individual's own attitude. Empirical supports for the relationship between social norms and behaviour have been found in studies (e.g., Thompson, et al, 1991; Bergeron et al, 1995; Ditsa, 2003; Ikart and Ditsa, 2004a, 2004b). Moreover, the relationship between social norms and behaviour is highly consistent with the TRA proposed by Fishbein & Ajzen (1975) which has been tested within the IS context (Davis, et al, 1989).

6. Conclusions and future direction

This paper has enhanced our understanding of the interactions that come to bear within social, cultural, individual and organisational variables capable of influencing the behaviour of executives towards the adoption and usage of EIS in their roles. The research model hypothesises that executives' behaviour positively relates to habits, facilitating conditions and social factors by means of PU, PEOU and ATU.

We posit that although there is a growing important of TAM instrument in the IS research domain, TAM suggests the technology is given. TAM lacks human antecedents such as cultural, social, subconscious habits and other organisational variables that are relevant in explaining the behaviour (Bagozzi et al, 1992). As a result, we have emphasised the importance of Triandis' framework variables such as habits, facilitating conditions and social factors, which are relevant in explaining the behaviour (Triandis, 1979).

Triandis links habits to individual past experience and the ability to perform a given act. Accordingly, we argue that the more years of experience that executive had with EIS the more his/her perceived usefulness and perceived ease of use of EIS. Further, the higher the executive's ability in using EIS, the higher his/her perceived usefulness and perceived ease of use of EIS. The social factors of Triandis' model have been linked to Ajzen and Fishbein's social norms (Thompson et al, 1991), which have been empirically tested to influence the behaviour within a group. (Mao, 2002; Ditsa, 2003). Consequently, the level of facilitating conditions such as the EIS development processes, EIS management processes and organisational environment has been argued as the importance variable that can influence the behaviour towards EIS adoption (Ditsa, 2003; Ikart and Ditsa, 2004a, 2004b).

Although the study is ongoing, we assume overall, it has made a significant contribution to management practice and academic research. Future findings based on this study will provide better understanding of the choices of executives in using EIS. Also, the findings will assist EIS developers and implementers to understand the core information processing requirements for executives' tasks for which they are building EIS in order to implement appropriate EIS functionalities to support those tasks. Theoretically, the research model and the theoretical foundation will assist researchers to explain the factors that can influence the behaviour towards IS including EIS adoption in the workplace. Although the model is a third generation extension of original TAM, the model can be applied in other social science research domains including E-commerce, Internet banking and marketing. Further, the model can be used with different populations of IS users and different software choices.

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