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An Integrated Model for Online Transactuions: Methodological Issues and Challenges

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Abstract

The purpose of this paper is to present a theoretical model that is based on the overall framework of the technology acceptance models and the concern for information privacy models, to better understand the linkages between the determinants of online transactions in information systems research. Emphasising on the methodological issues used in IS research, the proposed integrated model is focusing on the mediating variables, or the so-called 'black box', referring to the relationships between the primary independent and dependent variables, in online transactions. As such in this paper we attempt to fuse acknowledged technology acceptance models with information security and privacy models by proposing a general model which will enable the empirical validation and study of the factors that influence the users' attitudes toward online transactions. The factors are represented in the model by variables (independent or mediating) and the analysis is proposed to be based on statistical techniques such as structural equation modelling. Since at this current stage the model is formed on a theoretical basis, we consider all mediating variables to be contained in a black box. Challenges such as the number of sub-boxes included in the linear causal process in a black box and what should be included in a sub-box are discussed.

Key Words Online transactions, technology acceptance models, concern for information privacy models, black box

Introduction

Significant progress has been made in the field of information systems (IS) over the last years in explaining and predicting consumers' attitude towards online transactions (Venkatesh and Davis, 2000). In this paper the term 'online transaction' is used to encompass any kind of data exchange between a consumer and a supplier (vendor) via a computer network communication channel which may have financial extensions. A representative example is an e-shop where consumers may order and pay for goods and services over the Internet. Clearly in order for a consumer to order say a book over the Internet, he or she will be required to provide the supplier with some information which may consist of personal data, payment related data (such as

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credit card information) and in some cases demographic data such as age, income, and so on. As expected, contacting a supplier remotely and providing personal information for enjoying a service could raise issues of trust, privacy and security. Research has been focused on three major key reasons for making consumers hesitant in transacting online: (1) characteristics of the information technology used (Davis, 1989), (2) consumer trust in the e-vendor (Gefen, Karahanna and Straub, 2003), and (3) privacy concerns of individuals (Smith, Milberg and Burke, 1996).

The first key reason considers that consumers have to be convinced that information technology (IT) is useful and easy to be used. Respectively, the so-called technology acceptance model (TAM) was developed arguing that the intention to use IT depends on the perceived usefulness and the perceived ease-of-use of IT (Davis, 1989). The second key reason considers that trust is the major determinant in all transactions. This is especially true in online transactions where the activity involves social uncertainty and risk (Fukuyama, 1995). Accordingly, Gefen et al. (2003) extended TAM by including trust in their model. The third key reason refers to privacy concerns of individuals that make them hesitant to engage in online transactions, because they have to give online information concerning personal data such as date of birth, social security number, identity card number, and credit card information. Hence, models have been developed relating the willingness of individuals to provide personal information to transact on the Internet with their internet privacy concerns (Dinev, Hart and Mullen, 2008).

However, although research in online transactions has been described to be as one of the most mature research areas in the IS literature (Hu et al. 1999), it has limited value in developing an understanding of how initial predicting factors impact actual online transactions. This is because most research has been focused on developing models that were concentrated on the two end-points of the online transaction relationship, i.e. the initial independent variables and the dependent variable. Very few models provided precise frameworks for defining the mediating specific mechanisms through which initial predicting factors influence actual online transactions.

The purpose of the present work is to fill this gap by proposing a general model for online transactions where the initial predicting variables refer to the key reasons for making consumers hesitant in transacting online, the dependent variable is actual transactions, and explaining the mediating mechanisms that take place between these two end-points. The emphasis thus of the proposed model is on understanding what is going on with respect to the specific mediating mechanisms, or in other words, to illuminate the ‘black box’ that exists between the two end-points (Wright and Gardner, 2003). The remainder of the paper is as follows. In the next section a brief literature review is presented emphasising the key variables encountered in the specific research field. An integrated model for online transactions is proposed in the third section. Sections four and five are concentrated on the measurement issues in developing the constructs used in research and on the statistical methods used in estimation and testing the hypotheses respectively. Finally, in the last section some challenges for future research are discussed.

Literature review

The technology acceptance model, TAM (Davis, 1989) is at present a well-recognised theory of technology acceptance in IS research (Gefen et al. 2003). In particular, TAM specifies that two factors – perceived ease of use and perceived usefulness – determine the intention to use of new IT, as it is shown in Figure 1. ***Perceived ease of use*** refers to ‘the degree to which a person believes that using a particular system would be free of effort’, ***perceived usefulness*** refers to ‘the degree to which a person believes that using a particular system would enhance his or her job performance’, and ***intention of use*** refers to ‘the behavioural intention to use the system’ (Davis, 1989: 320). Numerous empirical studies have shown that ‘TAM is a parsimonious and robust model of technology acceptance behaviours in a wide variety of IT' (Gefen and Straub, 2000). The underlying logic in these studies is reflected in the hypotheses that are associated with TAM, which are as follows (see Figure 1):

H_1: Perceived usefulness positively affects intention of using the IT.
H_2: Perceived ease of use positively affects intention of using the IT.
H_3: Perceived ease of use positively affects perceived usefulness.

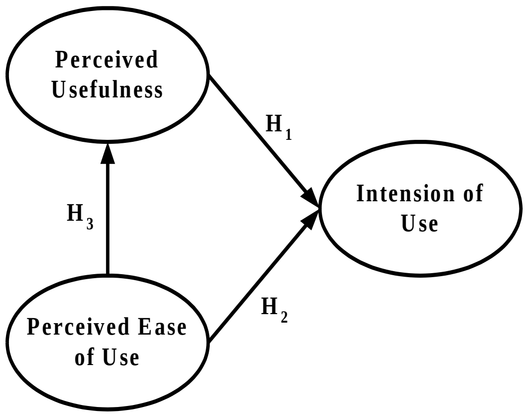

Figure 1: The Technology Acceptance Model (TAM)

TAM is considered to be a simple model that predicts the intention to use IT, as the dependent variable, with respect to perceived usefulness and perceived ease of use of IT, as the explanatory variables. In this relationship there are no mediating variables. However, according to the theory of reasoned action (TRA) which is one of the most fundamental theories of human behaviour, makes use of the mediating variable of attitude toward behaviour between the two ending points in a relationship; explanatory variables and dependent variable. ***Attitude toward behaviour*** refers to 'an individual's positive or negative feelings (evaluative affect) about performing the target behaviour (Fishbein and Aizen, 1975: 216).

Bearing in mind that trust is crucial in many transactions (Reichheld and Scheffer, 2000), TAM has been extended by advocating that trust will positively affect the intention of using IT. ***Trust***, 'is an expectation that others one chooses to trust will not behave opportunistically by taking advantage of the situation' (Gefen et al. 2003: 54). Furthermore, taking into account the long run ultimate benefits of a transaction with a trustworthy vendor, in terms of getting the expected products and services, it is assumed that trust will positively affect perceived usefulness of IT because trust determines the utility expected in transactions (Fukuyama, 1995). Similarly, another variable that may affect the intention of using IT is that of subjective norms (Venkatesh and Davis, 2000). ***Subjective norms*** refer to 'the person's perception that most people who are important to him think he should not perform the behaviour in question' (Fishbein and Aizen, 1975: 302). The rationale for an effect of subjective norm on intention of using IT is that people may choose the use of IT, even in the case where they are not themselves convinced about its consequences, by imitating people that are important to them (Venkatesh and Davis, 2000; Pavlou and Fygenson, 2006).

The technology acceptance model is offering a theory about the factors that may influence the intentions of an individual to use IT in his transactions. However, for the completion of a transaction in the Internet the individual must provide private information. 'Privacy and the requirement to submit of personal data are the primary factors that discourage users from shopping online' (Dinev and Hart, 2004). The individual's decision to provide private information may be influenced by many other factors such as '***collection:*** concern that extensive amounts of personally identifiable data are being collected and stored in databases', '***unauthorised secondary use (internal):*** concern that information is collected from individuals for one purpose but is used for another, secondary purpose (internally within a single organisation) without authorisation from the individuals', '***unauthorised secondary use (external):*** concern that information is collected for one purpose but is used for another, secondary purpose after disclosure to an external party (not the collecting organisation)', '***improper access:*** concern that data about individuals are readily available to people not properly authorised to view or work with this data', and '***errors:*** concern that protections against deliberate and accidental errors in personal data are inadequate' (Smith et al. 1996: 172). Accordingly Smith et al. (1996) developed the concern for information privacy (CFIP) model, where collection, improper access, secondary use, and errors are the drivers of individuals in the context of information privacy. In particular, ***privacy concerns*** refer to the reluctance of releasing personal information (Malhotra, Kim, and Agarwal, 2004: Dinev and Hart, 2006). Close to privacy concerns, although different, are the security concerns. ***Security concerns*** refer to the secure transmission of personal information during transactions (Belanger, Hiller, and Smith, 2002).

In the context of information privacy, IS research has incorporated privacy concerns about the need of government surveillance and government intrusion. ***Government surveillance concerns*** refer to the 'perceived need for the government to have greater access to personal information and to monitor personal activities' and **g*overnment intrusion concerns*** refer to the 'concerns about government monitoring of user's Internet activity and account information (Dinev et al. 2008: 219). However, the ability of the individual to control submitted personal information offsets the risk of possible harmful consequences. Specifically, ***perceived ability to control*** refers to 'the ability of the consumer to control personal information' (Dinev and Hart, 2004: 415). Accordingly Dinev et al. (2008) developed the Internet privacy concerns and beliefs about government surveillance model, where Internet privacy concerns, perceived need for government surveillance, and government intrusion concerns are the drivers of individual's willingness to provide information. Specifically, ***willingness to provide information*** refers to the 'willingness to provide personal information required to completed transactions on the Internet' (Dinev et al. 2008: 219).

Risk perceptions refer to the uncertainties related with the outcome of a decision (Malhotra et al. 2004). Specifically, in e-commerce literature risk is distinguished in two categories – product risk and transaction risk. Product risk refers to the uncertainty that the purchased product or service will meet their assumed properties, and transaction risk refers to the uncertainty that something adverse may result in a transaction process (Chang, Cheung and Lai, 2005). Associated with the transaction risk is the authentication risk, i.e. the uncertainty that the true identities of the transaction parties are not revealed, privacy risk, i.e. the possibility of theft of private information, security risk, i.e. the uncertainty that the transmitted data will be safe during transmission, and non-repudiation, i.e. the uncertainty that the messages exchanged are between the true transaction parties (Pavlou, 2003; Suh and Han, 2003; Chang et al. 2005). Accordingly, it is supported that risk perceptions are associated with trust and privacy concerns (Bhattacherjee, 2002; Malhotra et al. 2004). Furthermore, ***cost-benefit perceptions,*** being composed of costs paid and rewards received, and moreover indicating that 'customer discloses if benefits of disclosure exceed risks' (Culvan and Armstron, 1999: 108), are associated with trust (Gefen et al. 2003) and privacy and security concerns (Malhotra et al. 2004).

An integrated model for online transactions

In an attempt to better understand the linkages between the determinants of online transactions, Figure 2 presents a theoretical model that is based on the overall framework of the technology acceptance models and the concern for information privacy models presented above. The specific linkages between two successive variables in individual models have been presented in the literature review. The major characteristics of the proposed model are summarised as follows:

1. Individuals will proceed to an actual online transaction in cases where they are intending to use the IT system and are willing to provide personal information. They perform more transactions the higher are their intentions and willingness. This link is based on the theory of planned behaviour (Ajzen, 1991).
2. Individuals are intending to use the IT system and are willing to provide personal information, in cases where they have developed attitudes toward using IT (Hernandez and Mazzon, 2007). The more positive attitudes they have developed the more are willing to provide information and show intention to use the IT system. This link is based on the theory of reasoned action (Fishbein and Ajzen, 1975).
3. Individuals develop attitudes toward using IT, in cases where they believe that using the IT system is not risky and the benefits will be greater than the costs. These attitudes depend on the perceived importance in making the decision to adopt IT (Polatoglu and Ekin, 2001). The higher their risk perceptions and expected costs, the lower the development of positive attitudes toward using IT. This link is based on the motivation theory (Vallerand, 1997).
4. Risk perceptions and cost-benefit perceptions of individuals depend on the privacy concerns and security concerns of individuals. Privacy and security concerns are major obstacles in online transactions (Chen and Barnes, 2007). Individuals make calculations of risk and the costs and benefits of taking part in the transaction, which can be ascribed to their privacy and security concerns (Culnan and Bies, 1999). The higher their concerns the higher are their risk perceptions. This link is based on the classical economic theory.
5. Privacy concerns and security concerns of individuals are associated with a number of predicting factors. These concerns may be lower with government surveillance, and higher with government instruction respectively (government interference approach, Dinev et al. 2008), lower with trust beliefs and ability to control (CFIP approach, Smith et al. 1996; and social exchange approach, Keley, 1979), lower with usefulness and ease of use of IT (TAM approach; Davis, 1989), and lower with subjective norms (social influence approach; Fishbein and Ajzen, 1975).

In the proposed model the major serial links between constructs have been presented. However, there may be numerous links connecting any other constructs. For example, according to TAM, perceived ease of use may affect perceived usefulness (Davis, 1989), perceived ease of use may affect trust beliefs and trust beliefs may affect perceived usefulness (Gefen et al. 2003), there may exist antecedents of trust beliefs such as collection of data, unauthorised use of data, and errors of data (Dinev and Hart, 2004), risk perception may be a determinant of cost-benefit perceptions, and willingness to provide information may be associated with the intention to use IT.

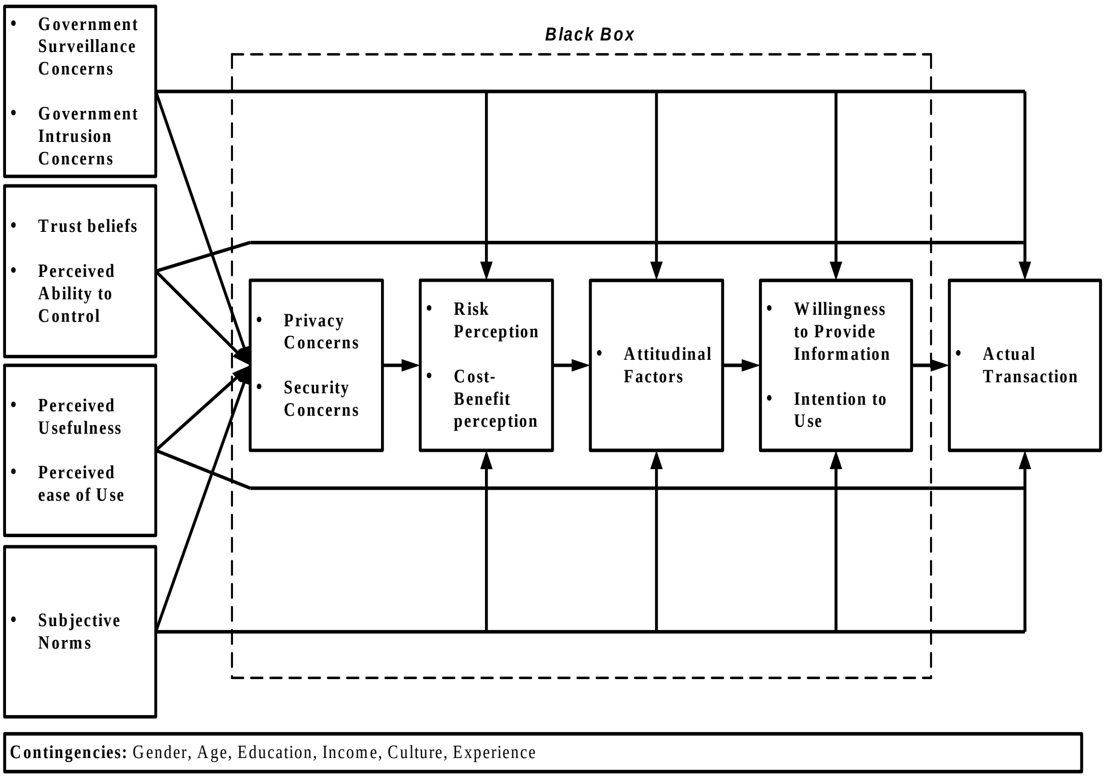

Figure 2 Online transactions: An integrated model

Furthermore, in the proposed model above we presented the direct links between two serially engaged successive constructs. However, direct links may exist between constructs that are not close enough. For example, perceived usefulness may affect intention to use IT, according to the performance expectancy approach, referring to 'the degree to which using an innovation is perceived as being better than using its precursor' (Venkatesh et al. 2003: 449), and ease of use may also affect the intention to use IT, according to the effort expectancy approach, referring to 'the degree to which a person believes that using a system would be free of effort' (Venkatesh et al. 2003: 451). Thus, in this example, intention to use IT is ***directly*** influenced by perceived usefulness and perceived ease of use and at the same time may be ***indirectly*** influenced through the ***mediating*** constructs of privacy concerns, risk perceptions and attitudinal factors. Nevertheless, the influences of some constructs on other constructs directly or indirectly through mediating constructs, are not necessarily mutually exclusive, but on the contrary, they can be complementary (Purcell and Hutchinson, 2007). Moreover, the direct and indirect, or mediating, effects of the linkages above may be ***moderated*** by factors such as gender, age, education, income, culture, and experience (Venkatesh et al. 2003; Sun and Zhang, 2006; Cho, Rivera-Sanchez and Lim, 2009).

Summarising, we may say that the theoretical frameworks used for explaining the online transactions relationship did not provide a specific structure that defines the precise mechanisms through which initial predicting factors influence actual transactions. In accordance to the human resources management discipline, these precise mechanisms could be considered to outline what is taking place in the so-called '***black box***' (indicated within the dotted lines in Figure 2) between initial predicting factors and actual transactions (Purcell et al. 2003). However, the usual research design in investigating the online transactions relationship was to statistically test whether individual or systems of predicting factors have a significant impact on actual transactions. This research design did not consider the intervening steps, or the mediating variables, between initial predicting factors and actual transactions. The mediating variables, shaping the 'black box' in the online transactions relationship, were considered to constitute one or more smaller boxes in a linear causal process from initial predicting factors to actual transactions. Numerous models have been proposed suggesting mediating variables between the two end-points in the online transactions relationship. Davis (1989), for example, suggested that perceived ease of use shape perceived usefulness that consequently have an impact on intention to use. Gefen et al. (2003) suggested that ease of use influence trust beliefs, which in turn affect intention to use IT. Similarly, Dinev et al. (2008) suggested that government intrusion concerns influence perceived need for government surveillance that affect internet privacy concerns, which in turn have an impact on willingness to provide personal information to transact on the Internet.

Measurement issues

Validating the instruments of data collection (e.g., questionnaires) in IS positivist research is one of the major issues that should be addressed. 'Without solid validation of the instruments that are used to gather data upon which findings and interpretations are based the very scientific basis of the profession is threatened' (Straub, Boudreau and Gefen, 2004). Straub et al. (2004) distinguished the validation methodologies into two general categories; (1) research validities and (2) innovation in instrumentation. Specifically:

1. ***Research validities*** comprises the following three (at least) highly recommended methodologies:
   a. *Content validity:* Refers to the right representation of the items that constitute a given construct (*typology*). It is established through literature reviews and experts in the profession (Straub, 1989).
   b. *Construct validity:* Refers to the basic question of 'whether the measures chosen by the researcher 'fit' together in such a way so as to capture the essence of the construct' (Straub et al. 2004: 15). Principal components factor analysis is usually employed in order to determine the underlying dimensionality, or empirical grouping (*taxonomy*), of the constructs indicated.
   c. *Reliability:* In contrast to construct validity that is an issue of measurement between constructs, reliability is an issue of measurement within a construct. It refers to 'the extent to which the respondent can answer the same questions or close approximations the same way each time' (Straub et al. 2004: 36). Cronbach's (1951) Alpha is the statistic most often used to evaluate reliability of a construct in terms of *internal consistency*.

2. ***Innovation in instrumentation*** comprises the following two highly recommended methodologies:
   a. *Use of previously validated instruments:* A number of scholars have provided the required rationale for the inclusion of constructs, definitions, and measures to the technology acceptance models and the concern for information privacy models as follows:

   Independent variables:
   - Government surveillance concerns (Dinev et al. 2008)
   - Government intrusion concerns (Dinev et al. 2008)
   - Trust beliefs (Culvan and Armstron, 1999; McKnight, Choudhury and Kacmar, 2002; Bhattacherjee, 2002; Gefen et al. 2003)
   - Perceived ability to control (Taylor and Todd, 1995a, 1995b; Dinev and Hart, 2004)
   - Perceived usefulness (Davis, 1989; Davis, Bagozzi and Warshaw, 1989; Gefen et al. 2003)
   - Perceived ease of use (Davis, 1989; Moore and Benbasat, 1991; Gefen et al. 2003)
   - Subjective norm (Mathieson, 1991; Taylor and Todd, 1995a, 1995b; Venkatesh and Davis, 2000; Venkatesh, Morris, Davis, and Davis, 2003; Pavlou and Fygenson, 2006)

Mediating variables:
- Privacy concerns (Smith et al. 1996; Malhotra et al. 2004)
- Security concerns (Salisbury et al. 2001; Malhotra et al. 2004)
- Risk perception (McKnight et al. 2002; Malhotra et al. 2004)
- Cost-benefit perception (Culnan and Armstrong, 1999)
- Attitudinal factors (Davis et al. 1989; Taylor and Todd, 1995a, 1995b; Venkatesh et al. 2003; Pavlou and Fygenson, 2006)
- Willingness to provide information (McKnight et al. 2002; Dinev et al. 2008)
- Intention to use (Davis, 1989; McKnight et al. 2002; Venkatesh et al. 2003)

Dependent variable:
- Actual transaction (Davis, 1993; Igbaria, Zinatelli, Cragg and Cavaye, 1997; Gefen and Straub, 1997; Lederer, Maupin, Sena and Zhuang, 2000)

b. *Creation of newly validated instruments:* Researchers should test the robustness of instrumentation following the content validity, construct validity and reliability methodologies.

Common method bias (CMB) is a measurement issue that is associated with the collection of data. It 'refers to the amount of spurious covariance shared among variables because a common method used in collecting data (Malhotra, Kim and Patil, 2006: 1865). As a result path coefficients and the degrees of explained variance may be overstated in consequent analyses (Straub et al. 2004). Harman's (1967) single-factor test is generally the most widely known method for investigating CMB.

Statistical analysis methods

To test the hypotheses raised in IS research the following analysis is usually employed:

- *Regression models:* They may be used for testing whether a variable mediates two other variables (Baron and Kenny, 1986). Considering that mediation is a hypothesised causal chain in which one variable, for example perceived ease of use (PEOU) in TAM (see Figure 1) affects a second variable, say perceived usefulness (PU) that, in turn, affects a third variable, say intention of use (IOU), this procedure is to conduct the following regressions (Katou and Budhwar, 2006):

  Step 1: Conduct a regression analysis with PEOU predicting IOU to test if there is an effect that may be mediated, IOU = a + bPEOU + e.
  Step 2: Conduct a regression analysis with PEOU predicting PU to test if PEOU is related to PU, PU = a + bPEOU + e.
  Step 3: Conduct a regression analysis with PU predicting IOU to test if PU is related to IOU, IOU = a + bPU + e.
  Step 4: Conduct a regression analysis with PEOU and PU predicting IOU to test if PU completely mediates IOU, IOU = a + b_1PEOU + b_2PU + e.

  Paths from PEOU to PU and from PU to IOU are the '*direct effects'*. The mediation effect in which PEOU leads to IOU through PU is the '*indirect effect'*. The indirect effect represents the portion of the relationship between PEOU and IOU that is mediated by PU. The purpose of Steps 1 to 3 is to establish that '*zero-order*' relationships among the variables exist. If one or more of these relationships are non-significant, mediation is not likely. Assuming there are significant relationships from Steps 1 through 3, one proceeds to Step 4. In Step 4, some form of mediation is supported if the effect of PU remains significant after controlling for PEOU. If PEOU is no longer significant when PU is controlled, the findings support '*full mediation*'. If PEOU is still significant (i.e., both PEOU and PU significantly predict IOU), the finding supports '*partial mediation'*.

- *Structural equation models (SEM)* or *latent variable models (LVM):* They may be used in investigating causal relationships between categorical variables (Hair, Anderson, Tatham, & Black, 1995). These models are defined by two components, namely the '*structural equation model*' and the '*measurement model(s)*' (Jöreskog and Sörbom, 2004).

Structural equation model: $\boldsymbol{\eta} = \boldsymbol{\alpha} + \mathbf{B}\boldsymbol{\eta} + \boldsymbol{\Gamma}\boldsymbol{\xi} + \boldsymbol{\zeta}$

where $\boldsymbol{\eta}$ is a mx1 vector of endogenous variables, $\boldsymbol{\xi}$ is a nx1 vector of exogenous latent variables, ζ is a mx1 vector of error terms, and $\boldsymbol{\alpha}$, $\mathbf{B}$ and $\boldsymbol{\Gamma}$ are coefficient matrices.

Measurement models:

$$\mathbf{y} = \boldsymbol{\tau}_y + \boldsymbol{\Lambda}_y \boldsymbol{\eta} + \boldsymbol{\varepsilon}$$
$$\mathbf{x} = \boldsymbol{\tau}_x + \boldsymbol{\Lambda}_x \boldsymbol{\xi} + \boldsymbol{\delta}$$

where the endogenous observed variables represented by the vector $\mathbf{y}$, and the exogenous observed variables contained in the vector $\mathbf{x}$ relate the observed variables to the latent variables, considering that $\boldsymbol{\varepsilon}$ and $\boldsymbol{\delta}$ are vector error terms and τ_y, $\boldsymbol{\Lambda}_y$, τ_x and $\boldsymbol{\Lambda}_x$ are coefficient matrices.

Each latent variable model is accompanied with a path diagram indicating all the causal relationships between the variables involved. As an example, the path diagram for TAM presented in Figure 1 is presented in Figure 3. In this figure the boxes represent exogenous or endogenous observed variables and the circles represent the related latent variables. Perceived ease of use is an exogenous latent variable (ξ_1) and perceived usefulness (η_1) and intention of use (η_2) are endogenous latent variables. The light arrows indicate the observed variables that constitute the related latent variable and the bold arrows indicate the structural relationships between the corresponding variables.

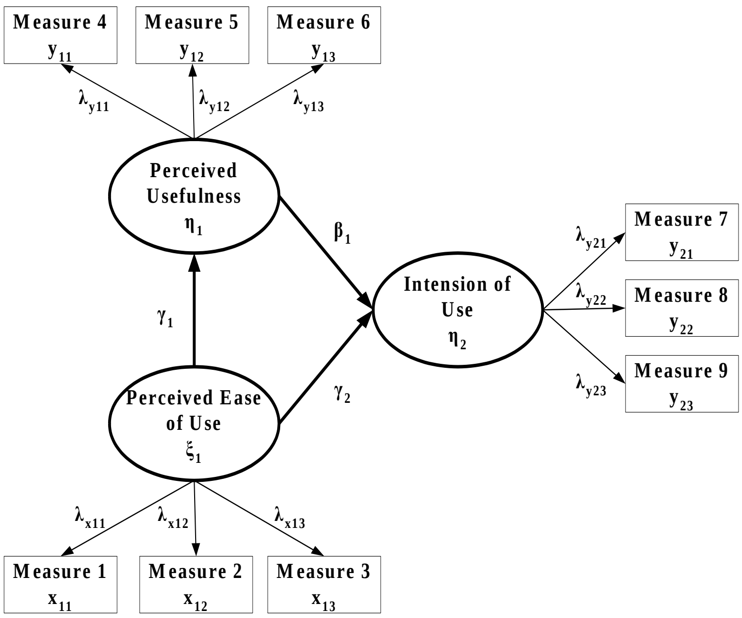

Figure 3: TAM as a structural equation model

It is argued that the methodology of structural equation models is much more powerful in investigating causal relationships between categorical variables (Bollen, 1989), and thus, illuminating the 'black box' in the online transaction relationship. 'SEM permits complicated variable relationships to be expressed trough hierarchical or non-hierarchical, recursive or non-recursive structural equations, to present a more complete picture of the entire model' (Gefen, Straub and Boudreau, 2000: 4).

In the so-called first generation regression models such as linear regression, Logit, and ANOVA, regression models require two separate analyses. First, they examine the quality of the constructs via factor analysis, and second, they test the hypothesised paths between the constructs. On the contrary, the second generation data analysis techniques such as SEM, combines simultaneously both analyses through the structural model (i.e., the assumed causation between independent and dependent constructs) and the measurement model (i.e., the development of constructs using observed measurements) (Gefen et al. 2000). However, 'the assertion of causation is applicable in SEM only when and because the data analysis corroborates theory-based causation hypotheses' (Gefen et al. 2000: 41).

Concluding remarks

In reviewing the theoretical perspectives that had been applied to the field of IS with respect to online transactions, most perspectives dealt primarily with applications of the theory of reasoned action (Fishbein and Ajzen, 1975), the motivation theory (for review see Vallerand, 1997), the theory of human behaviour (Triandis, 1977), the theory of planned behaviour (Ajzen, 1991), and the social cognitive theory (Bandura, 1986). While these applications have some value in clarifying some of the determinants of online transactions, they have limited value for aiding the understanding of how initial predicting factors impact actual online transactions. Consequently, they do not provide a precise framework for defining the specific mechanisms through which initial predicting factors influence actual online transactions.

It can be established from the above that the scope of the research area underpinning users' behaviour toward online transactions encompasses many research disciplines and therefore an attempt for a holistic treatment in a unifying model would be a challenging task. Nevertheless, a unifying model would clearly add value both to the IS researcher and the practitioner, as it would help the former to understand the problem space and be a valuable tool for the later (Wright and Gardner, 2003).

The validation of the proposed model by empirical means is currently part of ongoing and future work. So far several issues and challenges identified need to be addressed in order to complete the definition of model. These issues include the design of appropriate research instruments, establishing the exact number of sub-boxes and the mediating variables, as well as validating their relationships. The current literature contains a wealth of acknowledged research instruments for measuring all variables, mostly in the form of questionnaires. These research instruments need to be adopted in order to link the model with both the literature and the empirical aspects of the research.

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