



Facultad de Ciencias Jurídicas y Económicas
Departamento de Administración de Empresas y Marketing

DOCTORAL DISSERTATION

**BUILDING SUSTAINIBILITY AND TRUST IN THE USAGE OF ELECTRONIC
IDENTIFICATION USING TECHNOLOGY ACCEPTANCE MODEL**

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TESIS DOCTORAL

**SOSTENIBILIDAD Y CONFIANZA EN EL USO DE IDENTIFICACIÓN ELECTRÓNICA
CON TAM MODELO**

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To my father

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I would never have been able to finish my dissertation without the guidance of my advisors, help from friends, and support from my family.

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Section 1

Theoretical Development

CHAPTER 1. INTRODUCTION

1.1 JUSTIFICATION OF THE RESEARCH

An instance of financial risks appears during electronic transactions. Since online shopping has gained an increasing popularity worldwide, it has become much more possible to steal ones credit card information during an online transaction. There are several solutions proposed for this problem. However, there isn't any concrete solution which uses the customers' identity but some passwords which are easy to forget or be stolen from a customer. Therefore, a method based on proving ones identity during online transaction is needed. This might be possible using biometric authentication but as not cheap it is, a complete and ready to use biometric id system is needed for such an attempt. This welcomes biometric eID card which is currently being used in many countries for electronic authentication. The usage of biometric eID card offers several improvements in service speed and preventing identity theft and fraud possibilities. According to the definition of EU, e- identification is the process of unambiguously determining a

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person/entity's identity by using electronic means. Recently in Spain a new card, an advanced document with high safety measures which will prevent identity theft and serve as an electronic travel document, as well as being able to communicate with smart phones has been introduced. The new DNI features a fast microchip, with a higher capacity and certified to create an electronic signature, providing it with the same value as a signature on paper. It is believed that the online platform for the DNI 3.0 will create different mobile applications to manage services. (Euroweekly News, 2015)

In Europe many Member States provide their citizens with electronic IDs via smart cards, mobile phones, or other technologies: some Member States combine an eID with the function of an identity card used also as a travel document, others have a citizen card to access public online services, others work with mobile devices, or a combination of card and phone. (European Press Release, 2012) The advantages eID system offers might make it possible to introduce identity verification to online credit card transactions. Providing a brief inspection of traditional online

Chapter 1. Introduction

shopping systems and eID system, this study focuses on eID pilot project and describes the integration of the eID card to credit card based e-commerce systems. The last decade of the 20th century witnessed profound technological changes among which is the advent of electronic commerce, or the exchange of products and services and payments via telecommunication systems (Kalakota and Whinston, 1997). Besides its pros, there came its cons as well such as the loose of control over identity, risks of to be stolen. Thus this creates a resistance to new technologies and perceiving them differently.

National eID systems offer a variety of benefits for individuals, businesses and governments. These systems can help reduce identity theft and enable individuals to use online applications more securely in a variety of industries such as health care and banking. Individuals can use an eID to authenticate to online services, securely communicate online, purchase goods and services, and create legally-binding electronic signatures, such as to sign a contract. Businesses can use identity management functions to better interact with their customers on the Internet, such

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as to authenticate users to online applications or to verify the ages of their customers. Finally, government can use eIDs to streamline e-government services, allow individuals to sign and submit forms online, and offer innovative services.

Drawing from Service Innovation literature, high level business service is interpreted as one of the four service innovation dimensions identified by Den Hertog: "The service concept refers to a 'new value proposition' in a particular market. It describes which customer needs are to be satisfied and how this is achieved. It gives a detailed explanation of what the service is intended to provide to the customer and how the service offer is designed to do so". (Den Hertog, 2000)

According to this definition, the service concept for SPs can be defined by the following value proposition: eID as a service enables to outsource identification and authentication in order to accept federated identity credentials according to a required level of assurance. This enables SPs to profit from one or more of the following benefits:

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Achieve economies of production: Federated identity enables to reuse processes for identity proofing and existing credentials (offered by other service providers). This results in economies of scale: reduced costs of administration and costs of credential providing.

Improve the customer delivery process: Federated identity removes the necessity for customers to go through the same processes of identity proofing for different services and enables them to reuse credentials they have already acquired to access to your services. This results in improved 'customer friendliness'.

Focus on and improving core competency areas: Identity management is complex and time-consuming; however it is a necessity to enable your services. Federated Identity offers the advantage that you can focus on your competency areas while outsourcing your identity management activities.

1.2. OBJECTIVES OF THE RESEARCH

The aim of the research is to analyse the target audience and their perceptions according to the usage of eID and to answer the following question: "How can 'eID as a service' adoption by service providers be enhanced?" As a result of analysis, the purpose is to build a model to sustain the usage of eID in the selected countries. While carrying out the analysis new model proposed by author will be applied to the research. To achieve this goal the following tasks should be fulfilled:

- ✓ To analyse the transition from traditional banking to electronic banking
- ✓ To give brief description of electronic identification and its usage
- ✓ To explain the theory of technology acceptance model and e-trust model in correlation with eID
- ✓ To analyse selected banking systems TAM and e-trust model
- ✓ To suggest what could be improved using the model proposed by the author

Numerous theoretical approaches and models are considered and analysed throughout the research in order to accomplish research objectives. They are explained in the following chapter.

1.3. THEORETICAL PERSPECTIVES

The analysis of relationships between technology acceptance model, trust and eID usage that are analysed in this study brings together theoretical perspectives from various disciplines. Specifically, contributions from two fields of study are included: E-marketing trust and information technology in marketing literature.

1.3.1. Trust in e-marketing

According to the online trust views, trust is not only a short term issue but also the most significant long-term barrier for realising the potentials of B2C e-commerce (Gefen, 2000). Trust is also a significant antecedent of customers' willingness to engage in a transaction with web merchants (Jarvenpaa et al., 2000) Trust has long been considered as a catalyst in many buyer–

seller transactions that can provide consumers with high expectations of satisfying exchange relationships (Hawes et al., 1989). Many researchers have argued that trust is essential for understanding interpersonal behaviour and economic exchanges (Luhmann, 1988; McKnight and Chervany, 2002). competitive advantage. Taking into consideration those, it is assumed that the online trust plays a big role on usage and sustain of eID.

1.3.2. Technology Acceptance in Marketing

Of the various approaches to effects of information technology in marketing, interest of this research focuses on Technology Acceptance Model. (Davis, 1989) As a consequence, this research includes contributions from the TAM literature concerning the conceptualisation and operationalization of IT strategies, as well as those that propose causal linkages between TAM and its outcomes. The choice of choosing this model in recent study was due to its vast usage in the field. There are 519 researches titled with Technology Acceptance Model, whereas 9601 researches has been made between 1977 and 2015 years. Additionally, 912 of these researches were in

marketing field. Therefore, the model is subtle with the present study.

1.4. STRUCTURE OF THE DISSERTATION

This dissertation is designed in two sections. The first section includes the theoretical development and provides a literature review of the related concept that are mentioned in the research. Theoretical development allows to formulate the research model linkages between e-trust, eID usage and other variables leading to formulate the hypotheses. The second section is dedicated to empirical development. In this part, we introduced the methodology to be applied continued by the results and limitations of the study.

The two main sections are subdivided into eight chapters: the first four chapters include the theoretical section, the following two chapters include the empirical research and finally, chapter seven and eight includes the discussions and limitations of the research. The following table demonstrates the content of each chapter.

Chapter 1. Introduction

Section 1. Theoretical Development	Chapter 1	Introduction and justification of the research
	Chapter 2	Technology Acceptance Model, its antecedents and relation with the present study
	Chapter 3	Literature about trust theories, perceived risk, security and privacy
	Chapter 4	Electronic identification, Stork project
Section 2. Empirical Development	Chapter 5	The empirical research methodology
	Chapter 6	Results of the empirical research
	Chapter 7	Discussions and Limitations of the Research

Table 1.1. Structure of the Dissertation

CHAPTER 2. LITERATURE REVIEW PART 1: TECHNOLOGY ACCEPTANCE MODEL

2.1. INTRODUCTION

Researchers have frequently debated if the subjective norm is effective in determining intentions of persons and if they behave in a certain way or not (Turan, 2008). However, it been observed that subjective norm does not give reliable results in the use of computer systems. While some researchers have found a positive and meaningful effect of this variable on the “intention of use”, others couldn’t find this positive effect. Actual use is the degree of frequency and intensity of an individual's use of information technologies in his/her work. External factors are controllable or/and uncontrollable factors which are effective on human perceptions while an individual is using information technologies.

In this chapter, a literature review on one of the main variables of the proposed model of the research, technology acceptance model is given.

Antecedents of the TAM is being analysed and described detailed in order to give a deeper understanding for further chapter.

Chapter 2. Literature Review Part 1: Technology Acceptance Model

The chapter begins by discussing the features of theory of reasoned action. Following this, the chronological development of the technology acceptance model with an emphasis on the concept of marketing is described. Furthermore, it is presented an overview of some of the implications. The final section summarises the main points of the chapter.

2.2. THEORY OF REASONED ACTION

In today's information age, the principles of information and technology are rotated within its infrastructure that millions of people are depending upon each other and everyday trying to accept the new comers in technology world. User acceptance of technology has been an important field of study for over twenty years. Many studies have been conducted and proposed to explain the usage of the system; however the technology acceptance model has been the one that caught the attention of many information scientists. Hence, it made crucial for authors to have the understanding of technology acceptance model, for that it is interesting to have a

Chapter 2. Literature Review Part 1: Technology Acceptance Model

framework to understand this model, and this framework is Theory of Reasoned Action.

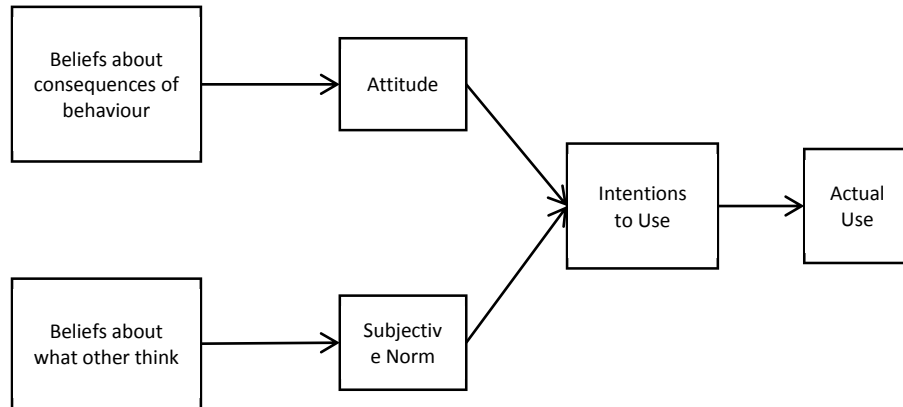


Figure 2.1. Theory of Reasoned Action

Source: Azjen&Fishbein (1975)

In their theoretical model, Fishbein and Ajzen suggested that a person's actual behaviour could be determined by considering his or her prior intention along with the beliefs that the person would have for the given behaviour. They referred to the intention that a person has prior to his actual behaviour as the behavioural intention of that person, and defined it as a measure of one's intention to perform a behaviour. The theories studying human behaviour have generally been developed in psychology literature and have widely been used in other academic disciplines. Ajzen explains that the theory

of reasoned action (TRA) is a special case of the theory of planned behaviour. The only difference between the two theories is that the theory of planned behaviour includes perceived behavioural control as an additional determinant of intentions and behaviour. In the development of the TRA it was assumed that people have volitional control over the behaviour of interest (and that they realize that they are capable of performing the behaviour if they so desire). Under these conditions, perceived behavioural control becomes irrelevant and the theory of planned behaviour reduces to the theory of reasoned action. (Ajzen, 1975)

Before developing the TRA, Ajzen took a deep analysis of the planned behaviour. In his 1975 article, he described the theory of planned behaviour, see Figure 2.2., perceived behavioural control, together with behavioural intention, can be used directly to predict behavioural achievement. At least two rationales can be offered for this hypothesis. First, holding intention constant, the effort expended to bring a course of behaviour to a successful conclusion is likely to increase with perceived behavioural control. For instance, even if two

Chapter 2. Literature Review Part 1: Technology Acceptance Model

individuals have equally strong intentions to learn to ski, and both try to do so, the person who is confident that he can master this activity is more likely to persevere than is the person who doubts his ability. The second reason for expecting a direct link between perceived behavioural control and behavioural achievement is that perceived behavioural control can often be used as a substitute for a measure of actual control. (Ajzen, 1991)

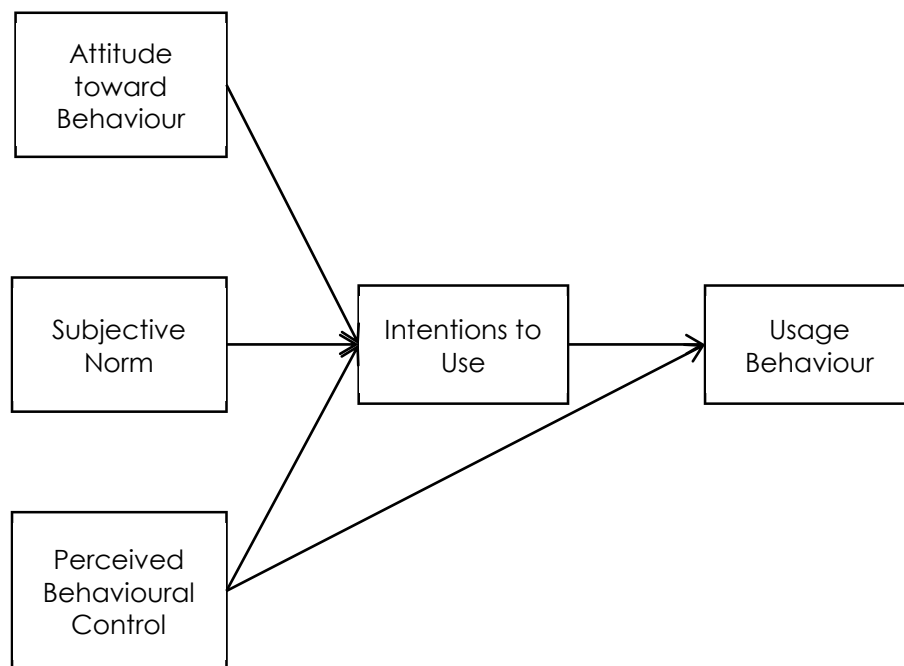


Figure 2.2. Theory of Planned Behaviour

Source: Ajzen (1991)

Chapter 2. Literature Review Part 1: Technology Acceptance Model

The Theory of Planned Behaviour (TPB) an extension of TRA, includes behavioural control as a construct to measure and account explicitly for the extent to which users have complete control over their behaviours, that is, the extent to which the behaviour is truly at the discretion of the user. In TPB, behavioural control directly affects intention to perform a behaviour, and may directly affect behaviour in situations where the user intends to perform the behaviour, but is prevented from doing so whether behavioural control is significant depends on the particular behaviour. (Dishaw, 1997)

In 1984, Verhallan and Pieters (Verhallan, Pieters, 1984) supported the idea of Sarver that the Ajzen and Fishbein model needs a concept that can take the effect of changes in situational circumstances into account (Sarver, 1983). They aimed to the dichotomous character of the proposed solution and as a result they developed a behavioural cost as a better alternative. In his studies, Bagozzi found that that intentions can mediate all the effects of attitudes on behaviour, but certain factors must be taken into account before this will occur. Moreover, the study showed that intentions do indeed mediate

Chapter 2. Literature Review Part 1: Technology Acceptance Model

the effects of attitudes on intentions when the associations among latent variables are corrected for attenuation, and the correspondence between intentions and behaviour is proper (Bagozzi, 1989).

Furthermore, Igbaria stated in his research that perceived ease of use plays a major role in affecting the use of computer technology, mainly indirectly through its influence on perceived usefulness and enjoyment. The results of their findings was that organizations need to understand the complexities surrounding the dynamic interaction between humans and computers. The paper also suggested that organizations should design training programs to increase individuals' knowledge about computer technology which may be beneficial in reducing potential barriers and increasing the individual's perception of ease of use (Igbaria, 1995).

The theory of reasoned action incorporates some of the central concepts in the social and behaviour sciences, and it defines these concepts in a way that permits prediction and understanding of particular behaviours in specified contexts. Attitudes toward the behaviour, subjective norms with respect to the

Chapter 2. Literature Review Part 1: Technology Acceptance Model

behaviour, and perceived control over the behaviour are usually found to predict behavioural intentions with a high degree of accuracy. In turn, these intentions, in combination with perceived behavioural control, can account for a considerable proportion of variance in behaviour (Ajzen, 1975). The theory of planned behaviour distinguishes between three types of beliefs-behavioural, normative, and control-and between the related constructs of attitude, subjective norm, and perceived behavioural control. A study showed that ego-centric psychographic metrics can enhance, but are by no means substitutes for, the results derived from analysing consumers' social network structures. (Hinz et al, 2014) The necessity of these distinctions, especially the distinction between behavioural and normative beliefs (and between attitudes and subjective norms) has sometimes been questioned (e.g., Miniard & Cohen, 1981). It can reasonably be argued that all beliefs associate the behaviour of interest with an attribute of some kind, be it an outcome, a normative expectation, or a resource needed to perform the behaviour. It should thus be possible to integrate all beliefs about a given

Chapter 2. Literature Review Part 1: Technology Acceptance Model

behaviour under a single summation to obtain a measure of the overall behavioural disposition.

In another longitudinal study, Chang focused on relationship between perceived behavioural control and predicting behavioural intention. The results of the study showed that perceived behavioural control is the most important predictor of intention to use illegal software copies. Chang's findings support Ajzen's conclusion after reviewing 16 studies of predicting intention using theory of planned behaviour that the addition of perceived behavioural control improved significantly the prediction of intentions. (Chang, 1998)

According to Shim's findings the elements of the Theory of Planned Behaviour in that perceived ease or difficulty of performing a behaviour is essential to whether or not the behaviour will be carried out. It also contributes to the information search literature demonstrating the link between consumer constraints and the number and types of search conducted (e.g., Avery, 1996). Additionally, findings offer support for the theoretical tenets of the economics of information theory, in which constraints are

Chapter 2. Literature Review Part 1: Technology Acceptance Model

perceived as costs that are compared to benefits in the analysis of whether or not to pursue additional searches. From the practitioner's view, the evidence indicates that perceived constraints should be mitigated by corrective strategies. For example, Internet retailers that offer in-store kiosks as a means for consumers to "learn" how to shop via the Internet could, in turn, bolster consumers' feelings of control through enhancing their Internet skill levels. (Shim, 2001)

Conner, highlighted a number of areas where current research suggests ways in which the theory of planned behaviour might be extended. This includes work on potential additional variables, such as belief salience, past behavioural habit, self-identity, and affective beliefs. In each case, there appears to be growing empirical evidence to support the inclusion of these additional variables in the theory of planned behaviour and some understanding of the processes by which these variables may be related to other theory of planned behaviour variables, intentions, and behaviour. Incorporation of all of these variables within the theory of planned behaviour might create an unwieldy theory. It seems unlikely that a

researcher would wish to include all of these variables in a single study. Rather, depending on the nature of the behaviour and the purpose of the study, different combinations of variables might be examined. The study proved that there is evidence to suggest that the theory of planned behaviour only provides an account of the determinants of behaviour when both motivation and opportunity to process information are high. Second, the expansion of the theory of planned behaviour in order to further describe the relationship of intentions to behaviour may provide a used way to develop the theory of planned behaviour in relation to understanding how attitudes impact on the achievement of goals. (Conner, 1998)

2.3. TECHNOLOGY ACCEPTANCE MODEL

Several models have been developed to investigate and understand the factors affecting the acceptance of computer technology. The theoretical models employed to study user acceptance, adoption, and usage behaviour include the theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the theory of

Chapter 2. Literature Review Part 1: Technology Acceptance Model

planned behaviour (TPB) (Ajzen, 1991; Mathieson, 1991), the technology acceptance model (TAM) (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), the decomposed theory of planned behaviour (Taylor & Todd, 1995), and innovation diffusion theory (Agarwal & Prasad, 1997, 1999; Brancheau & Wetherbe, 1990). However, current research has focused on the technology acceptance model (TAM) because the research seeks to understand the relationship between perceptions (such as perceived usefulness and perceived ease of use of technologies and usage behaviour.

One of these theories is TAM Model, see Figure 2.3, TAM has been developed by Davis in 1989 and has widely been used as the theoretical basis in the acceptance of technological application theories. TAM explains the motivational connections between an individual's perceptions, tendencies, intentions and behaviours in accepting information technologies. TAM is a theory which measures desires and intentions of computer users to use the technology on the basis of three basic factors. These three basic factors are as follows:

Chapter 2. Literature Review Part 1: Technology Acceptance Model

1. Perceived Usefulness - PU
2. Perceived Ease of Use - PEU
3. Behavioural intention – BI

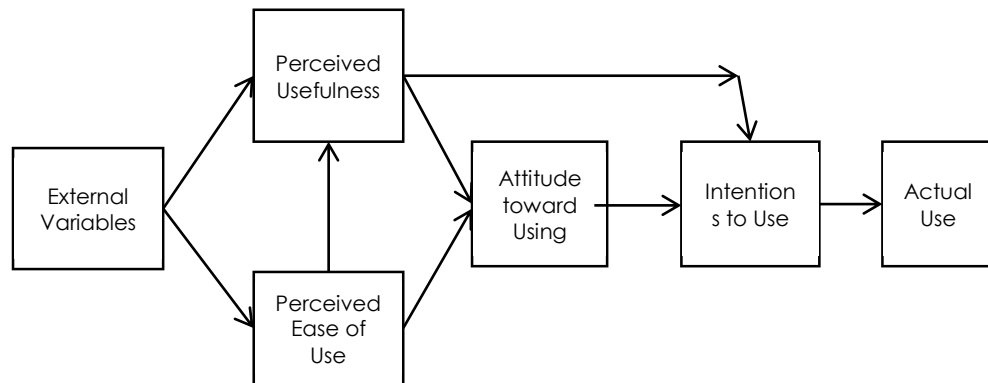


Figure 2.3. Technology Acceptance Model

Another research has been conducted by Adams by taking into account. The results of the studies demonstrate reliable and valid scales for measurement of perceived ease of use and usefulness. In addition, he examined the relationships between ease of use, usefulness, and usage using structural equation modelling. The results of this model found to be consistent with previous research, suggesting that usefulness is an important determinant of system use (Adams, 1992).

TAM suggests that Perceived Usefulness and Perceived Ease of Use determine a person's

Chapter 2. Literature Review Part 1: Technology Acceptance Model

behavioural intention. The perceived ease of use and perceived usefulness are other important variables determining a person's intentions towards computer use. The success and efficiency of these two variables in measuring individual intentions to use computer systems have been empirically proved by various researchers. While Perceived usefulness has been defined by Davis as the tendencies and thoughts individuals have about performance increase in their work done by using technology, perceived ease of use means the ease of use of a certain technology and learning of its use without exerting much efforts. Perceived ease-of-use is related to the performance increase provided by the use of any technology while the user is performing certain tasks and solving problems (Ma, 2005).

Because of its constrains, TAM has intensely been criticized and researchers have presented evidence in order to increase its explanatory power by adding different elements to the model. Some of the different elements added are attitude, subjective norm, actual usage, compatibility, external factors and such. The compatibility variable affects the perceived usefulness and perceived ease of use and

Chapter 2. Literature Review Part 1: Technology Acceptance Model

these two variables affect individual's attitude, and attitude, in turn, affects individual's intention towards attitude. It is maintained that the intention towards attitude triggers the activity of use. (Wu, 2007). Perceived usefulness has been defined as "the degree of belief that the use of certain system will increase the individual's performance". Perceived ease of use has been defined as "the degree of belief that the use of certain system will not require any efforts". (Davis, 1989) Behavioural intention is the indication of the individual's desires and efforts to realize a behaviour. Attitude is the tendency to react positively or negatively and it is an important variable determining computer use and intention to use computer Subjective norm includes whether an individual behaves in a certain way or not is affected by the attitudes of people important for the individual (Ma, 2005). Tan and his fellow researchers conducted a research on mobile learning .As a result, consistent with many past IT studies, perceived usefulness and perceived ease of use were found to be significant in adopting new technology like mobile learning

Chapter 2. Literature Review Part 1: Technology Acceptance Model

Whether the important people around the individual behave in a certain way or not has an effect on whether the individual will adopt that behaviour or not. Subjective norm has originated from the literature of social psychology and it expresses the opinions of the people important to the individual about whether he should undertake the behaviour in question or not. Researchers have frequently debated if the subjective norm is effective in determining intentions of persons and if they behave in a certain way or not (Turan, 2008). However, it has been observed that subjective norm does not give reliable results in the use of computer systems. While some researchers have found a positive and meaningful effect of this variable on the "intention of use", others couldn't find this positive effect. Actual use is the degree of frequency and intensity of an individual's use of information technologies in his/her work. External factors are controllable or/and uncontrollable factors which are effective on human perceptions while an individual is using information technologies. TAM, asserts that behavioural intention is the primary factor determining an individual's acceptance or refusal to use information technologies. In other words, it's the primary factor

Chapter 2. Literature Review Part 1: Technology Acceptance Model

determining actual use and that the behavioural intention of an individual has a significant role on his/her tendencies towards the use of these technologies. TAM states that a person's perceptions towards the usefulness of utilization and ease of use of information and communication Technologies have important effects in forming the/an individual's tendencies to use information and communication technologies. An individual's intention of use is indirectly affected by perceptions of usefulness and ease of use and these indirect effects come about through the individual's tendency factor towards use.

Perceived usefulness and ease of use are meant to be fairly general determinants of user acceptance. Davis et al. (1989) described them as belief sets that are meant to be readily generalizable to different computer systems (applications) and user populations. They argued that the ability to take robust, well-formed measures of the determinants of user acceptance early in the development process can have an impact on system acceptance by enabling developers to weed out bad systems, refine the rest, and generally cut the risk of delivering finished systems that get rejected by users. Davis

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provided strong theoretical support for his perceived usefulness and ease-of-use instrument(s) and used a rigorous development methodology (Davis et al., 1989; Davis, 1989). To make such comparisons, the instruments must be valid and reliable; they must also be robust across applications and demographic categories of users. If an instrument is robust, its value for practical decision making and research is greatly enhanced (Bejar, 1980; Gorsuch, 1970). An instrument can be considered robust if its items have equivalent meaning (i.e., equal item-factor loadings or true scores) across subgroups or conditions of measurement. Standardized instruments must provide equivalent measurement if comparative statements are to have substantive import. Without equivalent measurement, observed scores from different groups are in different scales and, therefore, are not directly comparable (Drasgow & Kanfer, 1985). In other words if users find the innovation useful, they are more likely to adopt the services offered. (Tan et al, 2014)

In his analysis on empirical research using TAM, Legris stated that results are not totally consistent or clear. This suggests that significant factors are not included

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in the models. The study conclude that TAM is a useful model, but has to be integrated into a broader one which would include variables related to both human and social change processes, and to the adoption of the innovation mode. (Legris, 2003)

In another study cultural dimensions of Hofstede was analysed with TAM by Straub. He made one of the first attempts to validate the TAM model outside the North America. In the study they compared knowledge worker perceptions and use of the same technology in three countries located on three continents; bases its predicted differences between these cultures on prior theoretical work; and tests the TAM model in three technically similar environments. (Straub, 1997)

In a recent research, additional factors such as consumer trust and consumer innovativeness added to the intention to use e-commerce websites. (Rodriguez, 2015) Age and gender has been researched by academicians as a moderator effect over TAM most came to the same conclusion; if any other factors affect older adults to resist new

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technology or other moderators and transit variables exist among these relationships (Lian, 2014)

An extension of technology acceptance model was developed by Vankatesh, see Figure 2.4. The technology acceptance model 2 was strongly supported across four organizations and three points of measurement (preimplementation, one month postimplementation, and three months postimplementation). Encompassing both social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use), technology acceptance model 2 provides a detailed account of the key forces underlying judgments of perceived usefulness, explaining up to 60% of the variance in this important driver of usage intentions. Moreover, technology acceptance model 2 extends TAM by showing that subjective norm exerts a significant direct effect on usage intentions over and above perceived usefulness and perceived ease of use for mandatory.

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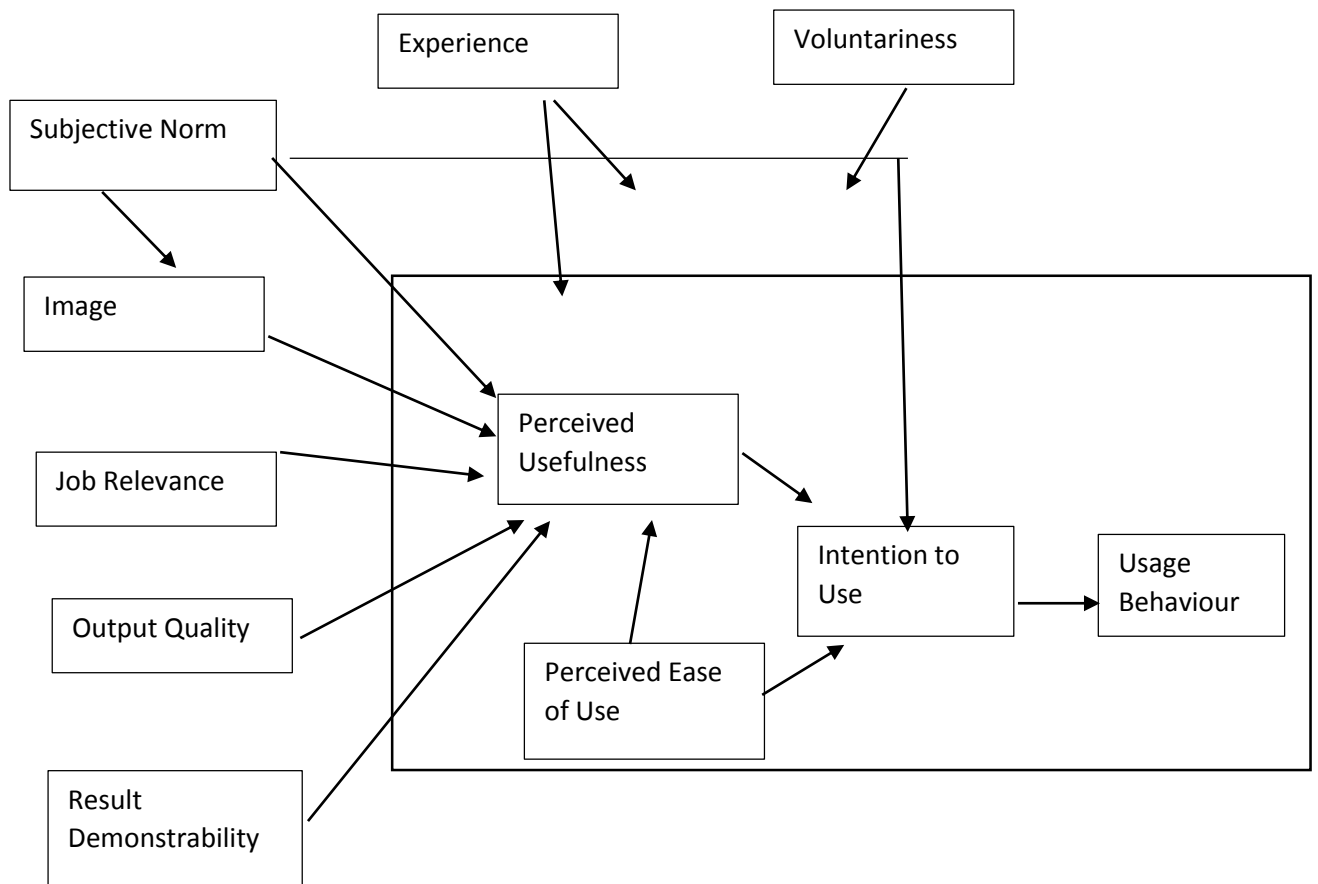


Figure 2.4. Technology Acceptance Model 2

Source: Vankatesh (2008)

The variables of the TAM 2 are as following:

Attitude: Individual's positive or negative feeling about performing the target behaviour (e.g., using a system)

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Behavioural intention: The degree to which a person has formulated conscious plans to perform or not perform some specified future behaviour.

Image: The degree to which use of an innovation is perceived to enhance one's status in one's social system.

Job relevance: Individual's perception regarding the degree to which the target system is relevant to his or her job.

Objective usability: A comparison of systems based on the actual level (rather than perceptions) of effort required to complete specific tasks.

Output quality: The degree to which an individual believes that the system performs his or her job tasks well.

Perceived ease of use: See the definition of effort expectancy.

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Perceived usefulness: See the definition of performance expectancy.

Result demonstrability: Tangibility of the results of using the innovation.

Subjective norm: Person's perception that most people who are important to him think he should or should not perform the behaviour in question.

Voluntariness: The extent to which potential adopters perceive the adoption decision to be non-mandatory.

In their work in 2003, Lee and Lanser asked the following question: "In what ways has TAM added value to the IS field?" Two major points were made as a result. TAM provided a parsimonious model to examine factors leading to IS acceptance. It includes a systematic grounding for research and focuses previously scattered work. This standardization allows an examination of findings to bring greater meaning to mixed or inconclusive results, thus leading to further work. Building on prior IS research, TAM conceptualized usefulness and ease of use as

Chapter 2. Literature Review Part 1: Technology Acceptance Model

important perceptions leading to intentions to adopt new systems. The IS field contains few such foundations for its research it has also provided a starting point for many extensions and elaborations, and has compared favourably to alternative or competing models of user acceptance." Fred Davis TAM provided a stream of research papers to aid and grow our knowledge about IS acceptance. TAM strengthened the IS field by its research rigor. It is a theory "owned" by the IS research community. In the IS field where theories are scarce, TAM served as an example for other areas of IS research. Growing and refining the theoretical foundation with tested measurement instruments will serve to legitimize the field in the eyes of other business disciplines. For example, some marketing studies use TAM as a theoretical foundation.

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Acceptance Model

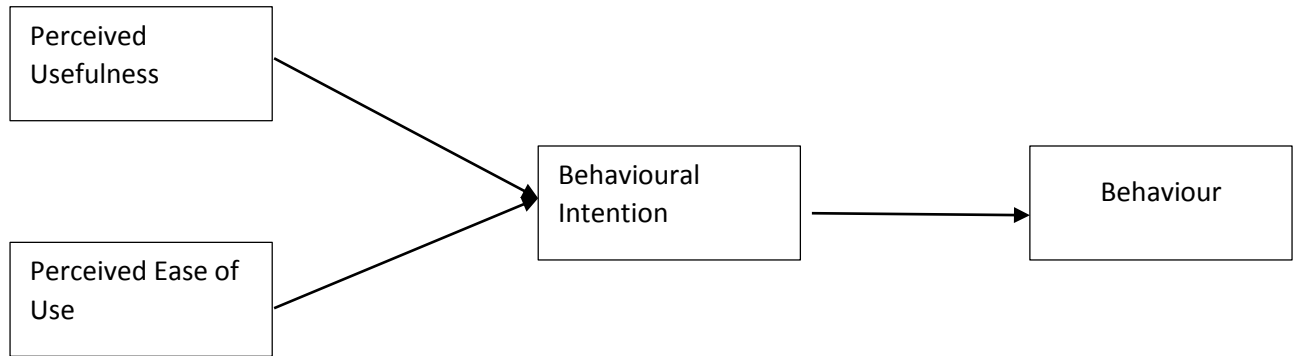


Figure 2.5. The Main Variables of Technology
Acceptance Model

Source: Lee (2003)

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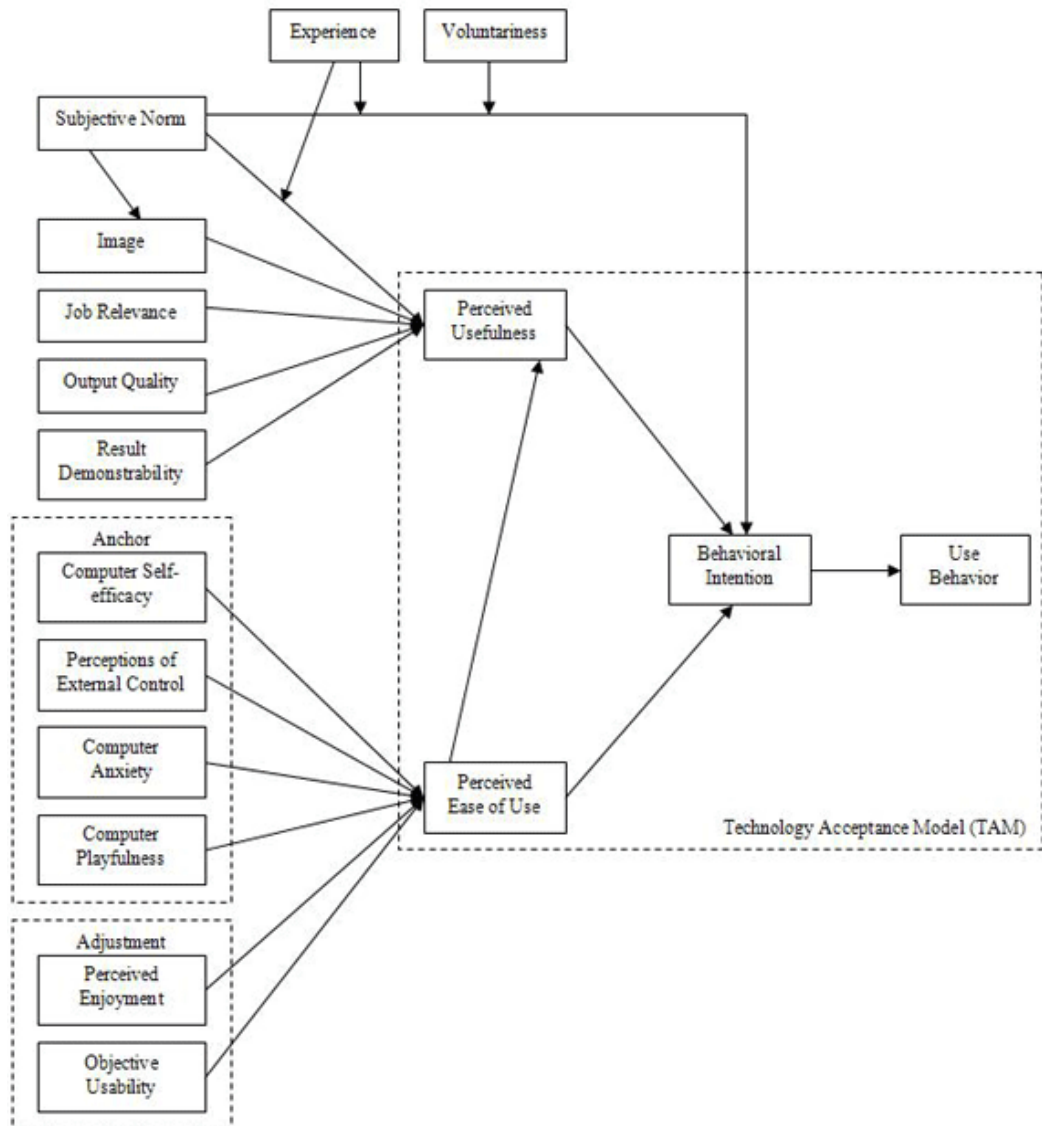


Figure 2.6. Technology Acceptance Model 3

Source: Vankatesh (2008)

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The variables of the TAM 3 describes as following:

Computer anxiety: The degree of an individual's apprehension, or even fear, when she/he is faced with the possibility of using computers.

Computer playfulness: The degree of cognitive spontaneity in microcomputer interactions.

Computer self-efficacy: The degree to which an individual beliefs that he or she has the ability to perform specific task/job using computer.

Facilitating conditions: The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

Perceived enjoyment: The extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use.

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Perception of external control: See the definition of facilitating conditions.

Social influence: The degree to which an individual perceives that important others believe he or she should use the new system.

The chronological progress of TAM across four separate periods was presented by Lee et al. (2003). This period covers 1986-2003. Hyndman and Davis (1992) presented the TAM period between 1986 and 1995. Following the introduction and validation period, TAM came to the extending period in 1994-2001. The elaboration period started in 2000 by Davis and then continued by Venkatesh and Bale (2008). In three periods the original structure of TAM was extended to TAM2 by Venkatesh and Davis (2000) and TAM3 by Venkatesh and Bale (2008). The extension of original TAM to TAM2 was extended in theoretical construct with putting social influence process (subjective norm, voluntariness and image) and cognitive instrumental process (job relevance, output quality, result demonstrability and perceived ease of use). TAM2 was proposed to better understand the determinants of perceived usefulness

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with organizational intervention and how it influences changes over time with increasing experience using the system. Venkatesh and Bala (2008) combined TAM2 and the determinants of perceived ease of use (Venkatesh and Davis, 2000). TAM3 present a complete network of the determinants of individual's it adoption and use. The new relationship that was displayed in TAM3 is experience which moderate the relations perceived ease of use and ease of perceived usefulness, computer anxiety and perceived ease of use perceived of use and behaviour intentions. In TAM3, Venkatesh and Bala (2008) suggest to investigate the effect of organizational intervention. The implementation of intervention was classified into two categories: pre-implementation and post-implementation. This stage model is examined to identify user reaction during pre-implementation and post-implementation. (Aggrowati, 2012)

In short, TAM, asserts that behavioural intention is the primary factor determining an individual's acceptance or refusal to use information Technologies. In other words, it's the primary factor determining actual use and that the behavioural

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intention of an individual has a significant role on his/her tendencies towards the use of these technologies. TAM states that a person's perceptions towards the usefulness of utilization and ease of use of information and communication Technologies have important effects in forming the/an individual's tendencies to use information and communication technologies. An individual's intention of use is indirectly affected by perceptions of usefulness and ease of use and these indirect effects come about through the individual's tendency factor towards use.

Based on the literature review and the main variables of the technology acceptance model, the following hypothesizes are postulated for the research:

Hypothesis 1: Perceived usefulness has direct influence on intention to use positively.

Hypothesis 2: Intention to use of electronic identification has a direct effect on its actual usage positively.

Hypothesis 3: Perceived ease of use has direct influence on intention to use positively.

2.4. CHAPTER SUMMARY

This chapter seeks to provide an understanding of the basis of technology acceptance model and its variables. In doing so, the chapter first introduces some of the models that enhance the further adjustment to the model, with an emphasis on two models: theory of planned behaviour and theory of reasoned action.

The chapter then discusses the technology acceptance model and its variables.

It is also provided the extended models review of some of the definitions and components.

This dissertation, will address the reasons and variables in order to sustain the usage of eID.

Regarding for reasons not to use the focus will be on variables like perceived risk and trust. (Chapter 3).

CHAPTER 3. LITERATURE REVIEW PART 2: TRUST AND ITS COMPONENTS

3.1. INTRODUCTION

Trust has been one of the most used theorems in both marketing and in management literature. In recent decades, different concrete frameworks have shown that the drivers of technology acceptance directly influence user behaviour (Lo and Lie, 2008; Kim et al., 2011). Although they were thought to be mediated without considering that other variables between these drivers and the employment of the technology. Suh and Han described one of the most important mediating variables is user trust (Suh, 2003). Trust is considered as a complex and abstract concept and there is no consensus on how it is formed or on how it affects behaviour (Bahmanziari et al., 2009).

In this chapter, a literature review on one of the main variables of the proposed model of the research, trust and related concepts to trust such as perceived risk, perceived privacy and perceived security is discussed. Because all these factors are not

researched enough in the literature, it is considered to mention them all together to make more sense.

The chapter begins by discussing the some theories on trust and its definitions. Following this, perceived risk, privacy and security is being examined. Furthermore, it is presented an overview of some of the implications. The final section summarises the main points of the chapter. The author aims to cover the literature review by the end of this chapter.

3.2. TRUST DEFINITIONS

3.2.1. Trust in Marketing

Trust has been considered to relate to benefits such as richer information competitive advantage firm performance and the attainment of long-lasting and profitable relation- ships. From an economic perspective, trust reduces transaction costs (Bromiley and Cummings, 1995) and, in the organizational literature, trust is posited to operate as a governance mechanism (Bradach and Eccles, 1989). Overall, trust is the source of fundamental positive consequences. Morgan and Hunt conceptualized trust as existing

Chapter 3. Literature Review Part 2: Trust and Its Components

when one party has confidence in an exchange partner's reliability and integrity. (Morgan and Hunt, 1994)

Çelik and Yılmaz describes perceived trust as both complicated and multi-dimensional structure. In traditional shopping methods, the risk level is very low, but in e-commerce, consumers have a lower level of trust. In e-commerce, trust plays an important role. Increases in the level of trust directly and positively affects the intention for e-shopping. Relations between classical TAM and trust have been widely discussed in prior studies in the literature. Successful e-shopping web sites and marketing activities are channels that ensure a low level of consumer risk perception and a high level of consumer trust. Trust in an online seller improves perceived usefulness in the short term and the long term [Gefen, 2000; Corbitt et al., 2003; Wang and Head, 2007; Kim et al., 2008]. Due to the nature of online purchases consumers take some risk levels for given.

3.2.2. Trust in E-government

Moris's research on e-government services had some significant results. It showed that trust in the Internet is likely to influence the adoption of e-government services. The majority of the participants said they had trust in the Internet because they believed the advanced security solutions and technologies in cyber space were capable of protecting inter-operations and electronic transactions against fraud and hacking. The results also revealed that participants' levels of Internet experience played an important role in enhancing trust in the Internet. This indicates that trust in e-commerce would lead to trust in e-government as similar procedures are involved in e-transactions in both domains. However, other results revealed that one third of participants (30%) thought that security and privacy issues were factors that might prevent them from trusting, and therefore using, e-government services. Many participants thought that if e-government services were not secure enough; their personal data would be under threat and could be altered or misused by hackers. These perceptions were gained from stories about

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hacker attacks, Internet crime and theft of credit card details. (Morris, 2008)

Another interesting statistic is usage of e-government practices in EU, see in Table 3.1. With regard to the use of e-government, 41% of individuals in the EU28 used the internet to interact with public authorities or services² in 2013. Reasons for this interaction reported by EU28 e-government users² were income tax declarations (44% of internet users who interacted with public authorities), requests for personal documents (20%), claiming social security benefits (16%) and enrolment in higher education or university (9%).

Chapter 3. Literature Review Part 2: Trust and Its Components

	Individuals who interacted with public authorities over the internet	Purpose of interaction*:			
		income tax declaration	requesting personal documents	claiming social security benefits	enrolment in higher education or university
	% of individuals	% of e-government users			
EU28**	41	44	20	16	9
Belgium	50	52	17	10	5
Bulgaria	23	50	5	8	23
Czech Republic	29	21	11	4	(2)
Denmark	85	74	18	19	4
Germany	49	35	9	9	3
Estonia	48	82	19	7	7
Ireland	45	25	26	7	8
Greece	36	63	30	23	8
Spain	44	44	34	20	16
France	60	57	22	30	12
Croatia	25	:	:	:	:
Italy	21	27	15	13	21
Cyprus	30	21	8	11	(5)
Latvia	35	41	8	8	(2)
Lithuania	34	70	9	8	3
Luxembourg	56	39	39	20	12
Hungary	37	38	20	12	8
Malta	32	(12)	34	(9)	17
Netherlands	79	57	17	18	7
Austria	54	60	15	10	6
Poland	23	51	9	(3)	6
Portugal	38	69	14	16	7
Romania	5	54	25	27	u
Slovenia	52	42	12	27	24
Slovakia	33	28	12	10	11

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Finland	69	56	19	20	15
Sweden	78	59	31	32	14
United Kingdom	41	18	29	10	7
Iceland	81	75	15	8	26
Norway	76	66	17	17	14

Table 3.1. E-government use by individuals for private
purposes

Source: Eurostat (2013)

In most Member States, the level of internet access was high in 2013, with shares of more than 90% in the Netherlands (95% of households), Luxembourg (94%), Denmark and Sweden (both 93%). The lowest shares were registered in Bulgaria (54%), Greece (56%) and Romania (58%).

Broadband internet access enables higher speed when browsing and performing activities over the internet. In 2013, in every Member State at least half of households had a broadband connection. Finland (88%) registered the highest share of broadband connections, followed by Denmark, the Netherlands, Sweden (in 2012) and the United Kingdom (all 87%) and Germany (85%).

3.2.3. Trust in Information Technology

Mayer defined trust as ‘‘the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor’’ (Mayer et al., 1995). In the technological point of view trust increases users’ beliefs that the selling party will not engage in timeserving behaviour (Gefen et al., 2003a). It is believed to include their perceptions about the seller’s ability, benevolence and integrity (Ganesan, 1994; Gefen, 2006; Kim and Tadisina, 2007). The approach makes the focus personal in nature because the object of trust is another person or group of persons and not the technical system. However, it must be taken into account that some technologies involve aspects that are beyond the direct influence of actors. These aspects are related to potential technological sources of errors and cannot be avoided by agreements with other actors. It is important to analyse the technology trust of users because it will condition their behaviour with the technology independent of the agents with whom they interact (Pennington et al., 2003-2004; Kim et al., 2009a).

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E-trust is a well-established and discussed limitation of customers online purchase plan and even it contributes to further commitment for discussed (bank) brand (Carmel and Scott, 2007). A trusted online customer would be more interested in trust worthy brand. If the trust is backed with some perceived factors like security, privacy and information, it also strengthens the relationship (Hoffman and Novak, 1996). As risk and trust in the online environment are relevant, which clearly shape purchase intentions (Zhao et al., 2010), E-trust is considered to be a mile stone while achieving the goal of loyalty through service reception and delivering services industry (Ribbink et al., 2004). The corporate image of financial institution contributes to trust, both in traditional and the online environment (Flavian et al., 2005). Furthermore, the strong trust feelings have a meaningful impact on online purchase intentions across cultures (Jin et al., 2008). Online transactions especially in financial institutions, widens trust and strongly pursue consumer purchase intentions (Yap et al., 2010). While lack of trust can not only seriously harm, but also deters the online purchase intentions (Merrilees and Fry, 2003).

3.2.4. Trust in Online Banking

Tero Pikkarainen in his survey on 2004 investigates online banking acceptance in the light of the traditional technology acceptance model (TAM), which is leveraged into the online environment. On the basis of a focus group interview with banking professionals, TAM literature and e-banking studies, they develop a model indicating online-banking acceptance among private banking customers in Finland. The model was tested with a survey sample. The findings of the study indicate that perceived usefulness and information on online banking on the Web site were the main factors influencing online-banking acceptance. The relationship between TAM and the trust factors have been a research topic in the last years. (Pikkarainen, 2004) These new usage of technology raised questions about the determinants of consumers' acceptance of internet banking. Using numerous different theoretical approaches and models several researchers have investigated the factors that impact the decisions of costumers to adopt internet banking Compared to face-to-face transactions, internet banking transactions have some unique characteristics, such as the extensive

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use of technologies, the distant and impersonal nature of the online environment, and the implicit uncertainty of using an open technological infrastructure for financial transactions (Yousafzai, 2003). These particular features of internet banking render a unique environment, in which trust is of crucial importance.

Consumer trust is an important factor in practically all business-to-consumer interactions and a crucial aspect of electronic commerce. Most empirical studies on consumer online trust focus on interpersonal trust, where the object of trust is the internet vendor whereas the influence of technology or system trust on online consumer behaviour is largely neglected. On a more general level, in a recent paper the lack of research on the role of dispositional factors in internet use was pointed out (McElroy, 2007). Disposition to trust is an individual difference variable that refers to the propensity or general tendency to be willing to depend on or become vulnerable to other persons. Previous research has shown that dispositional trust is of special importance in the initial stages of building new relationships in several studies the consumer's

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general disposition to trust was found to have an impact on the consumer's initial trust in an online vendor (Gefen, 2003)

Trust in general, is an important factor in many social interactions, involving uncertainty and dependency. From a functional point of view trust can be seen as a mechanism that reduces the complexity of human conduct in situations of uncertainty (Luhmann, 1989). Trust is central to any economic transaction, whether conducted in a retail outlet in the real offline world or over the internet, by means of a web site. However, trust is even more important in an online situation (Gefen 2003). One important reason for the importance of trust in e-commerce is the fact that in a virtual environment the degree of uncertainty of economic transactions is higher than in traditional settings. internet-based commercial transactions can bring about several risks that either are caused by the implicit uncertainty of using open technological infrastructures for the exchange of information (system-dependent uncertainty) or can be explained by the conduct of actors who are involved in the online transaction (The importance of initiating, building, and maintaining trust between buyers and

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sellers as key facilitators of successful e-commerce is increasingly being recognized in academic as well as in practitioner communities. Meanwhile a number of studies have investigated the role of trust in the specific context of business-to-consumer electronic commerce, having their roots in different scholarly disciplines and focusing on different aspects of this multi-dimensional construct.

The concept of trust has been defined by researchers in many different ways, which often reflect the paradigms of the particular academic discipline of the researcher. Some definitions overlap, but more often each definition offers an explanation of a different aspect of trust. Thus there are literally dozens of definitions of trust, which many researchers find contradictory and confusing. These problems particularly apply to the e-commerce domain research. In the organizational trust literature trust is mostly defined as a belief or expectation about the other (trusted) party, or as a behavioural intention or willingness to depend or rely on another party, coupled with a sense of vulnerability or risk if the trust is violated (e.g. (Mayer et al., 1995)). Accordingly, online trust is most often defined as a

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belief or expectation about the web site, the web vendor and/or (less frequently) the internet as the trusted party or object of trust or as a behavioural intention or willingness to depend or rely on the trusted In the context of internet banking, the trustee is typically a consumer who has to decide whether to Acceptance of internet banking adopt internet banking or stay with more traditional ways to undertake her/his financial transactions.

Environmental control in the context of e-banking will be referred to customers concerns with transferring information online due to expectation of threats to online security, including fear of hackers and informational theft, whereas control over secondary use of information will be concerned with privacy of the information provided to the bank while conducting online transaction. Furthermore, since the security and privacy concept vary from person to person and therefore it is chosen to use the terms perceived security and perceived privacy in order to determine how variation in these perceptions will affect the level of trust. (Benett, 2008) The effect of these variables on the trust is proposed to be moderated by the customer's perception of

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trustworthiness of the bank. The model is not all embracing in a sense that it does not attempt to capture every possible antecedent of trust. It is focused on capturing the most significant set of trust antecedents, derived from different lines of previous research, and presenting them as an integrated entity that can provide direction of empirical testing for future research. From drawing these the following hypotheses are formulated:

Hypothesis 4: Trust has direct influence on intentions to use of the EID positively.

Hypothesis 5: Trust has a direct influence on the actual usage of the EID positively.

In the Figure collected from EID Congress, can be seen the responses when the people have been asked up to what amount they are willing to use online banking when they make a transaction. The results showed that %30 people told they would use online banking for amounts like 10000 euros while %29 of them told that they would use always online banking no matter how high the transaction sum is.

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Only %6 of the respondents declared that they will not use online banking for any amount.

Advantages of Online Banking	Disadvantages of Online Banking
<ul style="list-style-type: none"> • access and check bank accounts seven days twenty four hours • the chance of making more profit exists in interest, funds and foreign currency transections • reduces transaction expenses of banks • more favourable figures for 	<ul style="list-style-type: none"> • Internet sites of banks can be closed for maintenance and update and some problems may arise in internet connection. • Slow systems create a negative impression on users/customers. • navigation in banking sites is difficult in the beginning • the weekend and holiday obstacle is continuing for many payments and EFT transections. • A check book or credit card can be kept away

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<p>interests and currency exchange rates when carried out online.</p> <ul style="list-style-type: none"> • transactions usually faster than ATM s or cell phone banking services. • reduce personnel and expenses in telephone banking services. 	<p>from others' reach or passwords can be entered secretly. potential to attack the user or exert efforts to have an access to his/her account</p>
--	--

Table 3.2. Advantages and Disadvantages of Internet Banking

Source: Durucu (2013)

3.3. FIRST COMPONENT OF TRUST: PERCEIVED RISK

Risk perception is the ability of an individual to discern a certain amount of risk, and risk tolerance refers to a person's capacity to accept a certain

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amount of risk. These two concepts, while unique, are very much linked. Many of the theories presented in this literature review postulate that inability to accurately perceive risk may lead to higher risk tolerance levels, which can encourage high-risk behaviour. Other theories posit that the causal flow could go in the opposite direction, with habitual engagement in high-risk behaviour leading to higher risk tolerance levels and lower risk perception ability. There is research to support both of these models. (Inouye, Campell Institute)

With the continuing rise of online interactions such as shopping, learning and banking it is important to understand how customers are searching for products prior to purchase and whether information source and perceived risk play any significant role in customers' search behaviour. Consumers' search behaviour has always been an area that was of a great interest among many academics and practitioners. It had been established that search behaviour is strongly correlated with purchasing stages and it acts as a main driver for marketing communication.

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The literature has described the willingness to assume the risk of disclosure as a dimension of trust (Nowak & Phelps, 1997). Accordingly, by disclosing privacy practices, entities such as banks can significantly ease customers' privacy concerns and can build a more trusting environment for online transactions. (Hoffman et al., 1999).

There are types of risk that consumers face every day before they decide consuming a product as listed below in the Table. Along similar lines, Ring and Van de Ven describe these two risk types, respectively, as "uncertainty whether the parties will be able to rely on trust" and "uncertainty regarding future states of nature" (Ring, 1994,). Because both subjective trust and perceived risk are multidimensional, the mirror-image relationship we proposed earlier needs now to be specified further. We will show that such a relationship exists only in distinct pairs that is, goodwill trust vs. relational risk, and competence trust vs. performance risk. Fink suggested that by catering the factors of perceived risk and privacy in developing countries, banks can urge the customer to move ahead for online services (Jaruwachirathanakul and Fink, 2005). The internet can never be declared a

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truly secure means of transaction (Wang et al., 2003) while financial institutions can have a positive impact for behavioural intentions by building trust and credibility. Online banking adoption depends upon an element of trust. (Mukherjee and Nath, 2003).

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Functional Risk	Fear that a product or service will fail to deliver promised functions or benefits.
Social Risk	The possibility that buying a product or using a service can reduce a person's status.
Time Risks	Particular time lost when a product turns out to need replacement or fails to deliver as promised.
Financial Risk	Potential purchase can tax or outstrip a person's monetary resources, now or in the future.
Psychological Risk	Whether a given purchase is the morally right choice.

Table 3.3. Types of Perceived Risk

Source: Kaplan (1972)

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Scholars are researching the relationship between risk and trust recently. Some examples are as listed in the Table below:

Peters, Covello, McCallum,1997	Trust is to be determine by perceptions of a number of attributes among them competence and expertise.
Sjoberg,2001	Trust is held to be crucial importance for the understanding of risk perception
Rippl, 2002	Why is one technology feared in some societies or social situations, but not in others
Boholm, 1996	Risk perception is a social phenomenon which cannot be studied in isolation.
Biel, Dahlstrand,1995	Trust in experts and authorities had a substantial impact on risk perception, while personal knowledge about nuclear waste disposal had no effect.

Table 3.4. Literature concerning perceived risk and trust

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Perceived risk is being listed among the factors influencing search behaviour together with trust in business, self confidence in internet skills, time spent online, emotional stage of searcher, product involvement. People perceive different risks such as, risky choice, wealth, risk tolerance or risk threshold. (Lackzo, 2014, Linkendin)

Das and Teng researched about the relation between perceived risk and trust. According to them, perceived risk is often defined as the probability of unfavourable outcomes, since the common usage of the term mostly refers to downside variances. Subjective trust and perceived risk can be understood within the formula of probability estimates and that the two concepts describe probabilities with contrasting mentalities. Although, subjective trust refers to assessed probability of having desirable action performed by the trustee, perceived risk is assessed probability of not having desirable results. Hence, subjective trust and perceived risk are like mirror images of each other. (Das and Teng, 2004)

Therefore it is postulated:

Hypothesis 6: Perceived risk has a direct influence on trust negatively.

3.4. SECOND COMPONENT OF TRUST: PERCEIVED SECURITY

Security has been widely accepted as one of the most important obstacles to the adoption of new technologies and internet banking. (Aladwani, 2001; Daniel, 1999). Security in e-commerce is being defined as a risk that causes "circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, fraud, and abuse" (Kalakota & Whinston, 1997, p. 88). In Bhimani's study, perceived security is defined as customers' perceptions of the degree of protection against the above-mentioned risks. Security can be increased by the use of sufficient encryption, digital signatures, and firewalls (Bhimani, 1996). Nevertheless, user's perceptions of online security raise different considerations. Even if it is possible to measure the degree of security objectively in every transaction, it is unclear if this measurement would easily match to customers'

perception of security. In the risky environment of e-commerce transactions the objective, scientific perspective is usually different from the subjective, intuitively grounded one (Schenk, Vitalari, & Davis, 1998).

Hartano and his fellow researches made important additions to IS research with their research on measuring perceived security. First of these contribution was to identify and validate three important dimensions of perceived security. Previous studies used measures of perceived security that tend to capture only one dimension or are dominated by only one dimension. However, in their study the inclusion of these dimensions in the measure of perceived security is more consistent with the way this construct has been conceptualized in earlier studies. Secondly, this inclusions encouraged more detailed analyses which include the effect of each dimension on other important variables in the model. For example, previous studies have demonstrated that perceived security positively affects customers' intention to use B2C e-commerce websites .Identification of the major dimensions of perceived security gave to researchers and

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opportunity to incorporate depth to their analyses and emphasise the importance of each of these dimensions for improving customer's intentions.

Liu found that internet literacy affects privacy concerns. In general, as the internet literacy increases, people are less worried about their privacy due to their familiarity with the techniques they can exercise to better control their personal information. This supposition probably only works to a certain extent because most internet users are non-techies and many of them rely on automatic procedures for their protection. Such an automatic protection does not go well when an individual passes his/her private information to a third party without knowing during online activities, such as games, information search and online registrations. As an individual becomes more aware of the many ways that a third party can have an access to user information, they may become more concerned how their personal information is transmitted and used by a total stranger (Liu,2011)

Drawing from reasoning, it is hypothesized that:

Hypothesis 7: Perceived security has a direct influence on trust negatively.

3.5. THIRD COMPONENT OF TRUST: PERCEIVED PRIVACY

Perceived privacy is the consumer's ability to control the presence of other people in the environment during a transaction; and banks' dissemination of customer-provided information only in accordance with the consumer's wishes (Goodwin, 1991). Hence, the present study defines perceived privacy as customers' perceptions regarding their ability to monitor and control the collection, use, disclosure, and subsequent access of their information provided to the bank during an online transaction. The conventional marketing approach suggests that expressions of control (awareness of information collected and its use) are the predominant influences on the degree to which customers experience privacy concerns (Sheehan & Hoy, 1999). Consumers in online environments perceive little control over information privacy, and this has a striking influence on their willingness to engage in trusting relationships with Web merchants. Using customers' data for purposes other than the original transaction is seen as

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an invasion of their privacy and an illegitimate use of information on the part of the company. Financial services customers are more reluctant to use these services from fear that their financial life will become an open book to the Internet universe (Bestavros, 2000). Thus, there is a risk of loss of privacy, which is a significant factor in building trust.

The literature has described the willingness to assume the risk of disclosure as a dimension of trust (Nowak & Phelps, 1997). Accordingly, by disclosing privacy practices, banks can significantly ease customers' privacy concerns and can build a more trusting environment for online transactions. Trust arising from perceived privacy could best be achieved by allowing the balance of power shift toward a more cooperative interaction between online business and its customers (Hoffman et al., 1999). At a minimum, it means market-driven industry acceptance, enforcement of opt-out policies, and recognizing customers' rights to data ownership.

Findings in the present study show that Internet literacy affects privacy concerns. Generally as the Internet literacy goes up, people are less concerned

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of their privacy due to their familiarity with the techniques they can exercise to better control their personal information. This assumption perhaps only works to a certain extent as most Internet users are non-techies and many rely on automatic procedures (e.g., antivirus scans) for their protection. Such an automatic protection does not go well when an individual unknowingly passes their private information to a third party during online activities, such as games, information searches and online registrations. As an individual grows more aware of the many ways that a third party can collect user information, they may become more concerned of how their personal information is transmitted and used by a total stranger. (Liao, 2008)

In a recent survey by Eurostat, People disclose personal data, including biographical information (almost 90%), social information (almost 50%) and sensitive information (almost 10%) on these sites. 70% said they were concerned about how companies use this data and they think that they have only partial, if any, control of their own data. 74% want to give their specific consent before their data is

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collected and processed on the Internet. (Eurostat, 2014)

As conclusion to all the mentioned above it is posited:

Hypothesis 8: Perceived privacy has a direct influence on trust negatively.

A review of some of the most relevant empirical studies in the field in the next table shows underlying assumptions about the variables that explain the influence of the variables such as perceived risk, perceived usefulness and trust on different industries in most empirical studies.

Table 3.5.A literature review on items of the conceptual model

AUTHORS	ITEMS	SECTOR	SCALE TYPE
Lin,2010	Ease of use, Intentions to Use	Mobile Banking	seven-point Likert scale
Pikkarainen et al, 2004	Perceived ease of use Security and privacy Perceived usefulness	Online Banking	five point Likert scales
Hung, Chang and Kuo, 2012	Perceived usefulness Perceived ease of use Trust Intentions to Use	Mobile E-Government	seven-point Likert scale

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Lee, Tsai and Lanting, 2010	Perceived usefulness Perceived ease of use perceived risk;	Online Banking	seven-point Likert scale
Loukis, Pazalos and Salagara, 2011	Perceived ease of use Intention to use	E-Services	seven-point Likert scale (Cronbach:0,852,0,882)
Foon and Yin Fah, 2011	Trust, Intention to Use	Internet Banking	Five point ordinal scale
Yousafzai, Foxall and Pallister, 2010	Perceived privacy Perceived security Trust Perceived ease of use Perceived usefulness Intentions to use	Internet Banking	seven-point Likert scale
Venkatesh and Davis, 2000	Intention to Use Perceived Usefulness Perceived Ease of Use	Organizations	seven-point Likert scale
AlAwadhi and Morris, 2009	Perceived Ease of Use Perceived Usefulness Culture	E-government	Focus group, interviews

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Yaghoubi and Bahmani, 2010	Perceived ease of use Perceived usefulness Intentions to use	Online Banking	five point Likert scales
Ling et al, 2011	Perceived Risks Trust	Online Purchase	five point Likert scales
Chan and Chong, 2012	Perceived ease of use Perceived usefulness Perceived security risk	Mobile Commerce	five point Likert scales
Adams, Nelson and Todd, 1992	Perceived Usefulness Perceived Ease of Use	Messaging technology	seven point scale
Lee, 2008	Perceived usefulness Perceived ease of use Perceived Risks	Online Banking	seven-point Likert scale
Chung et al, 2010	Perceived ease of use Perceived usefulness Behavioural intention	Online Community Sites	five point Likert scales
Shim et al, 2001	Intentions to use	Online Shopping	7-point semantic differential scale

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Monavarian, Kashi and Mehr, 2010	Perceived ease of use Perceived usefulness Behavioural intention	E-Recruitment	five point Likert scales
Shih and Chen, 2011	Perceived ease Perceived usefulness Intention to use	Mobile commerce	five point Likert scales
Chaudry et al, 2011	Intention to use Trust	E-service	five point Likert scales
Belanger and Carter, 2005	Perceived ease of use Trust Intention to use	E-government	Survey
Gaitan, Correa and Cataluna, 2011	Perceived ease of use Perceived usefulness Behavioural intention	Web based learning	five point Likert scales
Chang and Tseng, 2011	Perceived risk Intention to use	E-store	five point Likert scales

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Thomas and Veloutsou,2011	Perceived ease of use Perceived usefulness Behavioural intention Trust	Branding	3-item scales 5 items scales
Pavlou,2003	Perceived ease of use Perceived usefulness Perceived risk Trust	E-commerce	seven point scale
Tersiz et al, 2012	Perceived ease of use Perceived usefulness Behavioural intention Culture	Education(CBA)	seven-point Likert scale
Liebana-Cabanillas et al, 2013	Perceived ease of use Perceived usefulness Trust	E-banking	five point Likert scales
Dickinger and Stangl,2013	Perceived ease of use Perceived usefulness Trust	Tourism	Likert scales
Dishaw and Strong, 1997	Perceived ease of use Perceived usefulness Intention to use	Information technology	seven-point Likert scale

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Loukis, Pazalos and Salagara, 2012	Perceived ease of use Actual usage	E-services	seven-point Likert scale
Taylor and Strutton, 2009	Perceived ease of use Perceived usefulness Trust Perceived risk	Internet	Meta-analysis
Gong et al, 2004	Perceived ease of use Perceived usefulness	E-learning	seven-point Likert scale
Çelik and Yılmaz, 2011	Trust Perceived ease of use Perceived usefulness Intentions to use	E-shopping	five point Likert scales
Sanayei and Jafari, 2011	Perceived ease of use	Electronic banking	five point Likert scales
Gefen and Straub, 1997	Perceived ease of use Perceived usefulness Culture (Gender)	Information Technology	Questionnaire

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Gefen and Straub, 2000	Perceived ease of use Perceived usefulness	E-commerce	seven-point Likert scale
Leong et al, 2013	Perceived ease of use Perceived usefulness Gender (social influence) Intentions to use	Mobile entertainment	five point Likert scales
Hung et al, 2012	Trust Perceived ease of use Perceived usefulness	E-government	seven-point Likert scale
Igbaria et al, 1995	Perceived ease of use Perceived usefulness Age Gender	Information technology	five point Likert scales
Singh, 2012	Perceived ease of use Perceived usefulness	E-banking	five point Likert scales
Sriwindono and Yahya, 2012	Perceived ease of use Perceived usefulness Culture Intentions to Use	Information and Communication Technology	Cross sectional survey

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Grabner-Krauter and Faullant, 2008	Trust Perceived Risk	Internet Banking	seven-point-rating scales
Yoon and Steege, 2012	Perceived ease of use Perceived usefulness Perceived Security	Internet Banking	Nominal and seven point Likert scales
Hanafizadeh et al, 2012	Perceived ease of use Perceived usefulness Trust Perceived Risk	Mobile Banking	seven point Likert scales
Kim et al, 2007	Perceived Risk Trust Intentions to Use	E-commerce	seven point Likert scale
Luarn and Lin 2005	Perceived ease of use Perceived usefulness	Mobile Banking	seven point Likert scales
Yousafzai, Pallister and Foxall, 2007	Perceived privacy Perceived security Trust Perceived Risk	Online Banking	seven point Likert scales

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Dinev et al, 2009	Perceived ease of use Perceived usefulness Intentions to Use Culture	Information Technology	five point Likert scales
Aloudat et al, 2013	Perceived ease of use Perceived usefulness Perceived Risk Trust	Mobile government	five point Likert scales
Ramón-Jerónimo et al, 2013	Perceived ease of use Perceived usefulness Gender Age Intentions to use	Information Technology	five point Likert scales
Romero et al, 2011	Perceived ease of use Perceived usefulness Intentions to use Trust Perceived Risk	Social Media	five point Likert scales
Straub, Keil and Brenner, 1997	Perceived ease of use Perceived usefulness Intentions to Use Culture	Information Technology	Questionnaire

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Belanche, Casaló and Flavián, 2012	Perceived ease of use Perceived usefulness Intentions to use Trust	E-government	seven point Likert scales
Lin et al, 2011	Perceived ease of use Perceived usefulness Intentions to use	E-government	five point Likert scales
Lin and Wang, 2011	Perceived ease of use Perceived usefulness Intentions to use Perceived Risk	Mobile commerce	five point Likert scales
Tsai and Chien, 2014	Perceived ease of use Perceived usefulness Intentions to use	Internet Banking	five point Likert scales
Mekovec and Hutinski, 2012	Perceived Risk Perceived security	Online Marketing	five point Likert scales
Chellappa, 2014	Perceived Risk Perceived security Trust	Electronic Commerce	seven point Likert scales

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Zhang, Doorn and Leeflang, 2014	Culture	Banking	Survey
Santouridis and Kyritsi, 2014	Perceived ease of use Perceived usefulness Intentions to use	Internet Banking	seven point Likert scales
Mee and Huei, 2015	Perceived Risk Intention to Use	Online Shopping	5 point Likert scale
Yang et al, 2014	Perceived Risk Perceived Security	Online Markets	5 point Likert scale
Yusta, Lara and Pascual, 2014	Perceived ease of use Perceived usefulness Intention to use Actual usage	Mobile Advertising	5 point Likert scale

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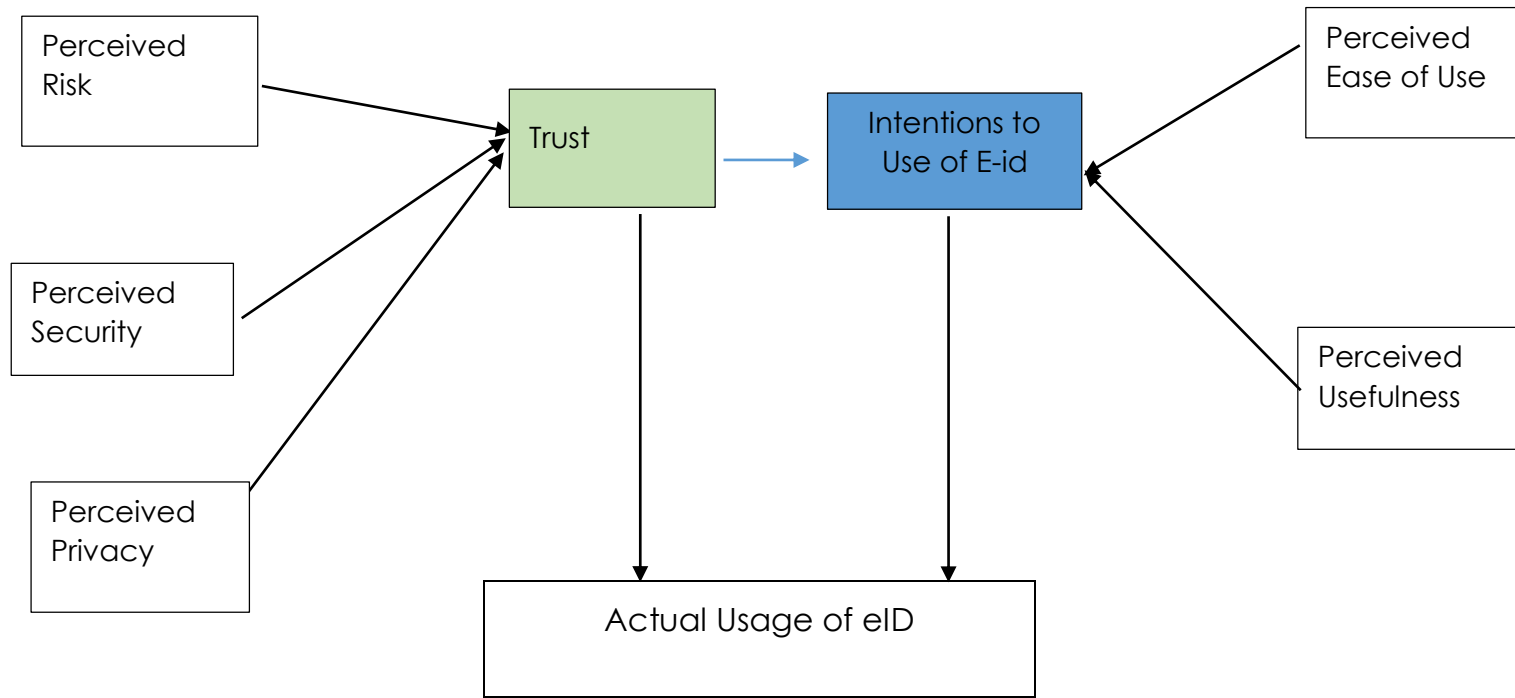


Figure 3.1 Conceptual Model of the Research

3.6. CHAPTER SUMMARY

The purpose of this chapter is to develop a conceptualisation of trust based on the e-marketing premises. In doing so, it is followed the same logic used in the previous chapter to justify the topic.

Trust has been an attractive factor for many researchers in both marketing and behavioural sciences. Its components vary from author to author as it is mentioned throughout the chapter. Here, drawing from reasoning, it is concluded that trust is a multidimensional concept. However for the purpose of this research it is assumed that it has 3 main components: perceived risk, perceived security and perceived privacy. Furthermore the existence of interrelations between these factors are shown in a literature review.

Furthermore, more hypotheses are added to the previous ones. The section concludes with the scheme of the conceptual model of the research.

CHAPTER 4. INTRODUCTION TO ELECTRONIC IDENTIFICATION

4.1. INTRODUCTION

In this chapter, the subject of the research, electronic identification is described. Electronic identification is a new concept hence there is not scientific research regarding it. Earlier, researchers have been conceptualized biometric identification or electronic signatures but one identification for a regional area has not been proposed.

The reason to choose this topic is to provide a scientific base to the STORK 2.0 project and try to analyze the steps for long-term sustainability. Firstly, the definitions and some background on the topic is provided in this section. It is then followed by the explanation of the aims of the project.

Lastly, some statistical information gathered from Eurostat is being presented to have a more in-depth analysis and connect ideas with the previous theory, technology acceptance model.

4.2. DEFINITION OF EID

In a generic way, an “Electronic identity” is a means for people to prove electronically that they are who they say they are and thus gain access to services. The identity allows an entity (citizen, business, administration) to be distinguished from any other. An electronic identity (eID) is distinct from a digital identity card even if in some cases, the two concepts could converge. In the Table 4.1., the difference between some concepts are described

Entity	Any natural or legal person or any information system that shall be characterized through a collection of identity attributes of which at least one subset of such identity attributes uniquely represents it.
Identity of an Entity	The collection of all the entity's identity attributes. An entity has only one such collection or set of all its identity attributes; to this extent one can say that one entity has only one identity
Identity of a Person	A collection of an entity's identity attributes that uniquely represents that entity.
Authentication	The corroboration of a claimed set of attributes or facts with a specified, or understood, level of confidence
Entity Authentication	The corroboration of the claimed identity of an entity and a set of its observed attributes.
Data	The corroboration that the origin and the

Authentication	integrity of data are as claimed.
Data Authentication Data	Data in electronic form which are attached to or logically associated with other electronic data and which corroborates the identity of the entity at the governed by public law.
Electric Signature	Data authentication data which states, indicates the expression of, expresses a binding commitment, consent, intent, endorsement, adherence from the signatory towards the associated data.
Electronic Identification	Technologies and authentication services are essential for transactions on the internet both in the private and public sectors.

Table 4.1. Terminology of EID

Source: European Commission's Information Society
(2013)

An electronic identity is a means for people to prove electronically that they are who they say they are and thus gain access to a panel of services. From an electronic identity perspective, one person is usually

involved in multiple sectors and also often fulfils different roles depending of the context. Therefore, the corresponding data should be managed in an independent way. Dealing with this content-rich electronic identity will require adequate legal provisions in terms of data protection and personal control over personal data by the individual. National identity cards and passports are primarily issued by member states in order to address a specific sector: the necessity to have travel documents. The authorities retain control over its usage. For such specific usage, a digital identity card is a natural replacement. The digital identity card is a physical token containing personal information used for proving that the holder is a specific person, a citizen of a given country. Depending on the type of use, an electronic identity does not necessarily imply the use of a physical item such as a smart card or a USB token .Additionally a person's identity exceeds the duration of a specific physical item: while an electronic identity card has an expiration date, the identity of a natural person does not expire. Conversely, a digital identity card can be considered a one potential physical container, among others

(USB stick, mobile phone, bank card...), to deliver an electronic identity.

Beyond the sectorial use as travel document, the digital identity card can also be used as container for additional sector-specific identities (e.g. social security). Combined implementations of the electronic identity and the digital identity card can be beneficial, but it is a matter for Member States to decide if and how they may be related and/or bound to each other. Biometrics is referred to as a number of methods to prove that persons are who they say they are using their physical features (such as photo, fingerprints, hands scans, eye patterns, ear patterns...) or behaviour (such as voice recognition, signatures...). Several countries are currently implementing passports and electronic identity cards including biometric information for proving that the holder is a specific person.

Author, Year	Topic
Uchida, K.,2002	Biometric Identification
Artmann, R., 1999	Electronic Identification
Kim, MC., 2004	Electronic national identification

Table 4.2. Literature titled Electronic and biometric identification

Source: Web of Knowledge

As can be seen in Table 4.2., electronic identification lacks from recent scientific research and the previous researches do not cover the items like trust or technology acceptance. STORK project is aimed to fill this gap by proposing the project that is described in the following point.

4.3. STORK 2.0 PROJECT

Through the courtesy of Universidad Jaume I, and STORK 2.0, the data of this thesis was obtained. Mainly, STORK project works towards the creation of

a single framework and infrastructure for cross-border electronic identification and authentication in the European Union. It is first implemented from 2008 to 2011, STORK project allowed citizens to access e-government services securely, effectively and quickly in any Member State they live in, move to or temporarily reside by using the electronic identification systems provided by their home countries.

The project is piloted around the following topics:

1. . eLearning & Academic Qualifications
2. . eBanking
3. . Public Services for Business
4. . eHealth

The aim of the project is to implement cross-border eID services in real-life settings and validate common specifications, standards and building blocks, convincingly addressing challenging legal and governance issues. The four pilot applications will facilitate borderless digital living and mobility in the EU, enhancing the digital single market for public and commercial services in alignment with the services

directive. The aim of the projects are; accelerate the deployment of eID for public services, extend eID for the authentication and digital signature of natural persons as established by STORK, with the same functionalities for legal persons, especially SMEs, throughout the EU, maximize the take-up of its scalable solutions throughout the EU, test, in real life environments, secure & easy-to-use eID and attribute solutions in four cross-border pilots.

The expected impact of the project defined as followed:

1. Enable interoperability of the identification of natural and legal persons and other sector identification.
2. Explore possible ways to address a federated & trustworthy framework for cross-border eID services at European level.
3. Build the basis for a future widespread use of eID solutions across borders, contributing to Europe's leadership role of the eID market.
4. Facilitate digital living & mobility in the EU, envisioning eID as a Service Offering, with a

strong commitment to open specifications and long-term sustainability.

4.3.1. Sustainability of the project

At the end every innovative idea there is a need to develop a sustainability plan that addresses all these issues by analysing the main challenges, legal, organisational and technical barriers and finally outlining the way forward in sustainability.

STORK 1 stated that cross-border interoperable services are restricted because of legal and technical barriers. This is also an issue that needs to be addressed for a sustainable and widely interoperable STORK system with regard to its activities related to operation or compliance. It is important that the technologies and services developed and tested within the STORK project are key enablers that provide interoperable electronic identification management (eIDM) for access to eGovernment services and systems that exist in each member state can be linked through a Europe-wide eIDM platform which leaving intact the national approach to identification and authentication.

As pointed out, the knowledge of STORK in the area of sustainability focused primarily on technical and legal barriers. STORK 2.0 identified the main barriers and thereby provided input to the countries. But we also think that research in potential business models is of equal importance, the knowledge on this topic is not enough developed yet. A relevant conclusion is that, it is clear that any European policy framework should be conceptually able to integrate seamlessly with international developments, in order to support not only the internal market, but also international markets.

4.3.2. Privacy concerns regarding the usage

The need for privacy protection rises as the attribute provision enters the mainstream IT. Numerous European research SPs have expressed a particularly urgent need to include attribute exchange in their identity federation services. STORK has already addressed privacy risk issues several times either directly or through communication. STORK can also use opaque or transient identifiers .However, there are still risks related to the perception of electronic

identification as the privacy enhancing and/or privacy protecting solution. Finally, some privacy issues (e.g. partial information disclosure) are related to value vectors of user-centricity, as well as use of brokers (user privacy agents).

It is also expected that the new regulation on data protection and privacy, now under revision is also going to boost demand for privacy regulation compliant services. In Austria for example, the issuance of mandate (statutory plus explicit) rose about 50% when the application of data protection authority has been amended, and the main users are professional representatives e.g. lawyers filling applications on behalf of their clients (300-400 uses per month). This raises also a risk since in cross-border scenario the roles and responsibilities of national data protection authorities still have to be defined. Some studies for e-health services show savings up to 10% thanks to the use of privacy preserving eID.

SECTION SUMMARY

This section seeks to formulate a model that describes the technological and psychological barriers on technology usage, by drawing on prominent elements of the e-marketing and resource-based view literature.

The section begins by presenting the technology acceptance model. The development and the past of the model is explained thoroughly. Then focuses on other variable of the model, which is trust. Following this, electronic identification and Stork project is being described briefly.

Through the analysis of these relationships, the attempt is to determine the hypothesis and create a conceptual model. The summary of the hypothesis can be found in the following Table

H1	Perceived usefulness has direct influence on intentions to use of the EID.
H2	Intentions to use has a direct influence on the actual usage of the EID.
H3	Perceived ease of use has direct influence on intentions to use of the EID
H4	Trust has direct influence on intentions to use of the EID positively.
H5	Trust has a direct influence on the actual usage of the EID positively
H6	Perceived risk has a direct influence on trust negatively.
H7	Perceived security has a direct influence on trust negatively.
H8	Perceived privacy has a direct influence on trust negatively.

Table 4.3. Summary of the hypothesises

The following section operationalises the conceptual model by describing the method, measures, and procedures used to empirically assess the hypothesised relationships specified in the research model.

Section 2.

Empirical Development

CHAPTER 5. THE EMPIRICAL RESEARCH METHODOLOGY

5.1. INTRODUCTION

After defining the research hypotheses, this chapter introduces the design of the empirical research that allows to obtain information about the relevant variables in the hypotheses. The following chapter covers how data are collected and analysed, covering questions such as selection of statistical techniques, design of questionnaires or determination of information sources.

The general approach is quantitative, having obtained data through questionnaire. The first section of this chapter reveals the criteria used for the sample and discusses the appropriateness of the selected unit of analysis for the purposes of this research. In addition, it describes the data collection strategy followed to obtain information.

The second section covers this question by discussing the selection of measurement scales for the theoretical concepts included in the hypotheses. Finally, in the third section I specify the statistical

procedure that I used to analyse data in order to draw conclusions about the causal linkages between the variables. It is also described the suitability and benefits of Structural Equation Modelling (SEM) for this research together with the review some specific SEM techniques and models necessary to test the research hypotheses.

5.2. SAMPLE AND DATA COLLECTION

In this section, it is given the procedure used to obtain data on the variables included in this study. By doing so, first part represents the sample delivery and measurements. Secondly, the data collection strategies and the technical details of the empirical research are described.

5.2.1. Description of the Sample

Country and sector have been defined as control variables. This implicates, that the sampling frame must include different countries and sectors of interest. All countries participating in the project included in the sample.

The STORK and STORK 2.0 pilots demonstrate use cases for (1) E-Government; (2) E-Banking; (3) E-Health; and (4) E-Academia. For sampling purposes the telecom sector has been identified as an additional stakeholder. This research design includes telecom providers since in many cases they require a proof of identity to sell their products or services (new subscription, changing payment plans, etc.). This value proposition justifies the enclosure of telecom providers. According to the dimensions defined in the sampling frame, each participating member state representative are preferably representing the same organisations.

The sample description has been developed considering the following variables:

- a) Country
- b) Age
- c) Gender
- d) Marital status
- e) Children under 18 years of age
- f) Employment status
- g) Most recent employed post
- h) Size of current or most recent employer
- i) Occupation

j) Highest level when finished education

One of the main determinants of the sample is the country. The main respondents were from Spain with a sample of 1236 people. Spain is followed by Austria with 358 people, later 300 with Netherlands. The following Table shows the frequency and the valid percent of the sample by country.

Country	Frequency	Valid Percent	Country	Frequency	Valid Percent
Azerbaijan	1	0.03	Lithuania	110	3.26
Austria	358	10.60	Luxembourg	1	0.03
Belgium	126	3.73	Netherlands	300	8.88
Bulgaria	1	0.03	Norway	1	0.03
Cote d'Ivoire (Africa)	1	0.03	Poland	2	0.06
Czech Republic	28	0.83	Portugal	6	0.18
Estonia	146	4.32	Russia	1	0.03
Finland	5	0.15	Slovakia	32	0.95
France	7	0.21	Slovenia	83	2.46

Germany	8	0.24	Spain	<u>1236</u>	<u>36.59</u>
Greece	1	0.03	Sweden	112	3.32
Hungary	1	0.03	Switzerl and	46	1.36
Iceland	14	0.41	Turkey	29	0.86
India	1	0.03	United Kingdo m	211	6.25
Ireland	1	0.03	No country	381	11.28
Italy	127	3.76	TOTAL	3378	100.00
Latvia	1	0.03			

Table 5.1. Country

The age of the respondents were concentrated mainly between 26 and 55 years old. Meaning that the eID is used with 73.3% in adults.

UNDER	18	26	36	46	56	66	OVER
18	TO	TO	TO	TO	TO	TO	76
	25	35	45	55	65	75	
0.51	10.54	<u>23.64</u>	<u>25.68</u>	<u>23.98</u>	10.71	3.91	1.02

Table 5.2. Age

In terms of gender distribution that declared only by 748 people, 74.33% are male and 25.67% are female.

	Frequency	Valid Percent
Female	192	25.67
Male	<u>556</u>	<u>74.33</u>
TOTAL	748	100.00

Table 5 3. Gender

55.15% of the sample are married; followed by singles 19.78% and members of an unmarried couple 17.64%.

	Frequency	Valid Percent
Married	<u>1135</u>	<u>55.15</u>
Divorced	97	4.71
Widowed	20	0.97
Separated	36	1.75
Single	407	19.78
A member of an unmarried couple	363	17.64
TOTAL	2058	100.00

Table 5.4. Marital status

More than half of the sample (59.18%) reported having no children under 18 years old.

	Frequency	Valid Percent
Yes	834	40.82
No	<u>1209</u>	<u>59.18</u>
TOTAL	2043	100.00

Table 5.5. Children under 18 years of age

When it comes the employment, 74.83% told that they are employed for wages while 9.08% are self-employed.

	Frequency	Valid Percent
Employed for wages	<u>1549</u>	<u>74.83</u>
Self-employed	188	9.08
Out of work for more than 1 year	35	1.69
Out of work for less than 1 year	33	1.59
A home-maker	17	0.82
A student	116	5.60
Retired	115	5.56
Unable to work	10	0.48
Other	7	0.34
TOTAL	2070	100.00

Table 5.6. Employment status

Followed by the question about their most recent employed the 27.68% are working in higher managerial posts while ,middle managerial post makes up 20.37% and middle professional post 26.63%.

	Frequency	Valid Percent
Higher managerial post	228	11.41
Higher professional post	<u>553</u>	27.68
Middle managerial post	<u>407</u>	20.37
Middle professional post	<u>532</u>	26.63
Lower supervisory and technical	150	7.51
Clerical, sales, and service posts	128	6.41
TOTAL	1998	100.00

Table 5 7. Most recent employed post

52.84% of the sample reported to working a large organisation - with over 250 employees, while 17.82% works in medium sized organisation with up to 250 employees.

	Frequency	Valid Percent
Micro entity - organisation with up to 10 employees	235	11.83
Small - organisation with up to 50 workers	348	17.51
Medium-sized organisation with up to 250 employees	354	17.82
Large organisation with over 250 employees	<u>1050</u>	<u>52.84</u>
TOTAL	1987	100.00

Table 5.8. Size of current or most recent employer

The occupation of people that have been analysed in this study. And two most usual industries were: Public Sector 47.89% and Services 24.39%.

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	Frequency	Valid Percent		Frequency	Valid Percent
Forestry and Fishing	5	0.25	Charities and Not-for-profit Organizations	20	0.99
Mining and Quarrying	3	0.15	Hotels, Leisure and Entertainment	14	0.70
Other Agro-Industries	9	0.45	Insurance	12	0.60
Nuclear Energy, Electricity and Alternative Fuels	13	0.65	Legal Services	41	2.04
Oil, Gas and Coal	11	0.55	Libraries and Information Services	13	0.65
Water Companies	7	0.35	Property Services and Architecture	9	0.45
Other Energy and	11	0.55	Professional Bodies,	3	0.15

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Utilities			Housing Associations and Unions		
Aerospace Equipment	6	0.30	Retail/Wholesale Trade	31	1.54
Chemicals and Chemical Products	11	0.55	Sanitation, Refuse and Sewage Disposal	10	0.50
Defence Industries	8	0.40	Tourism and Travel	10	0.50
Electronics and Electronic Engineering	74	3.68	Transport: Rail, Air, and Shipping Companies	17	0.84
Food, Drink and Tobacco	24	1.19	Warehousing	2	0.10
Glass and Ceramics	4	0.20	Other Services	253	12.57
High-tech Industries	89	4.42	Civil Engineering	21	1.04
Household Products and Appliances	4	0.20	Other Construction	10	0.50
Machine Tools and	10	0.50	Central Government	348	17.29

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Other Machinery					
Metals and Metal Products	13	0.65	Education	168	8.35
Motor Vehicles	9	0.45	Health Authorities, Trusts and Hospitals	42	2.09
Office Machinery, Computers and Electrical Products	36	1.79	Local Government	235	11.67
Paper, Paper Products and Packaging	8	0.40	Social Services	24	1.19
Pharmaceuticals and Toiletries	8	0.40	Other Public Sector	147	7.30
Rubber and Plastics	1	0.05	Advertising and Public Relations	10	0.50
Textiles, Clothing and	11	0.55	Media	21	1.04

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Footwear					
Timber and Furniture	5	0.25	Publishing, Printing and Photographic Services	7	0.35
Toys and Sports Goods	4	0.20	Telecommunications and Postal Services	57	2.83
Other Manufacturing	18	0.89	Other Communications	30	1.49
Arts	6	0.30	TOTAL	2013	100.00
Banking and Financial Institutions	50	2.48			

Table 5.9. Occupation

Regarding to the highest level when finished education, the most frequent levels were: Graduate of any further education College or University 34.42% and Master 30.47%.

	Frequency	Valid Percent
Secondary education - graduated at ordinary or lower examination level	115	5.62
Secondary education - graduated at advanced or higher examination level	214	10.45
Uncompleted further education College or University	186	9.08
Graduate of any further education College or University	705	34.42
Masters	624	30.47
Doctorate	129	6.30
Post Doctorate	64	3.13
Other	11	0.54
TOTAL	2048	100.00

Table 5.10. Highest level when finished education

5.2.2. Procedure for Data Collection

This primary research was conducted through face-to-face semi-structured interviews with the sample of service providers. These primarily consisted of two

panel interviews. When the member state fails to include all sectors and panel representatives in the two panel interviews, it is required of them to conduct additional individual interviews until the entire sampling frame is significantly represented. The project leader of this task is BUAS. BUAS delivered all necessary material for conducting the interviews to each member state. The member state representatives are responsible to find a sufficient amount of service providers to guarantee sample significance. The member states representatives was committed to send all results (in English) to the BUAS before the communicated deadline. We approached both general public and individuals selected from a contact list. Regarding general public, we communicated the existence of the questionnaire and its access link using two of the most followed e-Government Twitter accounts.

Regarding individuals from contact lists, we used both personalised and generic e-mail messages. We targeted different groups according to the most appropriate Spanish partner to approach them. Hence, MINHAP took charge of addressing to the general public and UJI y UMU to the academic

community. Initially twitter accounts and specific contact list that were used, managed by the Spanish participating partners. Once we were aware that we were not achieving the expected results, we launched a new initiative, which was sending a generic e-mail to all the registered users of the e-Government Portal asking for their collaboration. Approaching the registered users of the e-Government Portal proved to be very successful. Even though the questionnaire was not translated into Spanish, the users responded in huge numbers. Our guess is that one of the main reasons for this is that, being users of the e-Government portal, their interest in eID issues is probably quite high, as well as their willingness to contribute to advances in that field.

The interviewer takes the leading role within the interview process. He/she has a firm understanding of the STORK 2.0 project and is responsible for an accurate presentation of the walkthroughs. The interviewer goes through the questions and acts as a moderator if necessary. It is of high importance that the interviewer is able to engage discussion and seek active participation of all interviewees to guarantee

best practices. Time management is the sole responsibility of the interviewer. After the description of each walkthrough, the interviewer will engage a discussion on the topic. The recorder is responsible for transcribing all qualitative information resulting from these discussions. He/she has to make notes on the statements and engagements of each participant (the information should be entered in the same words used by the interviewee). It is also required that the recorder writes a short reflection after each topic. This ensures that the questions which raised a lot of polemic can be identified during analysis. It is required of interviewees to actively participate during the interview process. Every participant should have the chance to make his/her statement clear and can always interrupt statements made by the interviewer and/or other participants.

The semi-structured interview will be twofold and will include quantitative as well as qualitative questions. To start, the interviewer has to introduce himself and present an introduction of STORK 2.0. The interviewer has to run through the topics to be discussed and clarify the goals of the interview. It is of high importance to clarify that the respondent will be

interviewed as an expert and will represent a group of organizations within his/her sector. The interviewer will move along the walkthroughs chronologically. After he/she presented a walkthrough, he/she shall go through the questions of the concerning section and stimulate an open discussion (role of the recorder applies here). Please note that it is the responsibility of the moderator to close a discussion when necessary (cfr. time management). Afterwards, each participant will receive a survey with closed and open-ended questions. The interviewer needs to engage the participants to fill-in the questionnaire and provide sufficient time for doing so.

Technical details of the empirical research	
UNIVERSE	500 million
SAMPLE SIZE	3378
SAMPLE ERROR	+/-1.69%
CONFIDENCE LEVEL	95%
SAMPLE SELECTION	Random
DATA COLLECTION PROCEDURE	Online Questionnaires, semi-structured interviews

Table 5.11. Technical details of the empirical research

5.3. STATISTICAL PROCEDURE

The testing of the hypotheses was carried out through Structural Equation Modelling (SEM) using the statistical programme EQS 6.2 for Windows (Bentler, 1995). The following section briefly describes some of the benefits of this statistical procedure and provide a review of some SEM techniques and models that are relevant for this research.

5.3.1. Description of Structural Equation Modelling

Structural equation models, also called simultaneous equation models, are multivariate (i.e., multiequation) regression models. Unlike the more traditional multivariate linear model, however, the response variable in one regression equation in an SEM may appear as a predictor in another equation; indeed, variables in an SEM may influence one-another reciprocally, either directly or through other variables as intermediaries. These structural equations are meant to represent causal relationships among the variables in the model. General structural equation models include unobservable exogenous or endogenous variables (also termed factors or latent variables) in addition to the unobservable disturbances. General structural equation models are sometimes called LISREL models, after the first widely available computer program capable of estimating this class of models (Jöreskog, 1973); LISREL is an acronym for linear structural relations.

Structural Equation Models are often called LISREL models, meaning Linear Structural Relations. The term 'structural relation' refers to the core concept of SEM

handling the relationships between latent variables. Such relations are usually formulated by linear regression equations, graphically expressed by so-called path diagrams using arrows. SEM is very flexible, because it deals not only with a single simple or multiple linear regression, but with a system of regression equations. The same variable may represent a predictor (regressor) in one equation and a criterion (regressand) in another equation. Such a system of equations is called a model. Hoyle points out, that the term model might be unfamiliar to some readers, but the concept itself probably is not. At the most basic level, a model is a statistical statement about the relations among variables". In the model depicted in the total effect of A on C can be decomposed into the direct effect of A on C and the indirect effect mediated via B. A model of the regressive dependencies between three variables, written as a path diagram. The path diagram represents a simple linear regression of B on A and a multiple linear regression of C on B and A. (Hoyle, 1995)

5.3.2. Methods for Estimation in SEM

Several methods can be used for estimation in SEM. The most common methods for estimation are:

- Generalized Least Squares (GLS) – Used for normally distributed data where factors and errors are independent.
- Maximum Likelihood (ML) – Used for normally distributed data where factors and errors are independent.
- Asymptotically Distribution Free (ADF) Estimator Used for non-normally distributed data but requires sample sizes over 2,500.

The estimation process, regardless of the method chosen, is intended to generate a fitting function that is close to zero. The model's estimated covariance matrix and the original sample covariance matrix are equal when the fitting function score is zero.

Two procedures are most often used for modifying a Structural Equation Model: the Lagrange Multiplier Index (LM) and the Wald test. These tests both report the change that occurs in the χ^2 value when the pathways are adjusted. If the model fitness is

increased by the addition of free parameters, the LM will indicate this is so. If the model fitness is increased by the deletion of free parameters, the Wald test will indicate this. These tests are similar to stepwise regression: the logic in forward stepwise regression is the same as that used in the LM model, whereas, the logic of backward stepwise regression is the same as that used in the Wald test

The last step in the SEM process entails examining the structural model validity. Three measures are used to determine the validity of the structural model: Chi-Square, an incremental fit index, and a "badness" of fit index. If the value of the Chi-Square test is not significant, the model is believed to be a good fit. Also important are that at least one incremental fit index (like CFI, GFI, TLI, AGFI, etc.) and one badness of fit index (like RMR, RMSEA, SRMR, etc.) meet criteria that have been predetermined. Examples of the two indexes are listed here, but they are beyond the scope of this article. The individual estimates of the free parameters are assessed in the final step. This is accomplished by comparing the free parameters to a null value by using a z-distribution.

To get the z-statistic, the market researcher divides the estimate of the parameter by the standard error of that estimate. To be significant, the answer -- which will be a ratio -- must be larger than ± 1.96 . Once the individual relationships in the model have been examined, it is necessary to standardize the parameter estimates. This allows the market researcher to interpret the parameter estimates in reference to other parameters in the model. In this way, it becomes possible to compare the relative strength of the path ways within the model.

Structural Equation Modelling (SEM) is a very useful tool for market researchers because it tests the expected casual relationships among variables. As with any statistical model, there are certain underlying assumptions that if violated call the data into question with regard to validity and reliability. Also there are both advantages and disadvantages to using Structural Equation Modelling.

5.3.3. Benefits and Limitations of SEM

The directionality in relationships between variables cannot be tested with SEM. Although direction of arrows are often shown in a Structural Equation Model, the direction represents the hypothesis that the market researcher has generated regarding causality in the system she is exploring.

Also, importantly, the choice of variables and pathways that a market researcher has used will limit the ability of the Structural Equation Model to recreate the sample covariance and variance patterns that have been observed. Structural Equation Modelling is really very good at distinguishing between the direct and indirect relationships between variables. It is also an excellent approach for analysing the relationships between latent variables without random error. (DeVault, 2013)

5.4. CHAPTER SUMMARY

In this chapter the empirical research design is described. Due to this, the first part of the chapter explained sample data collection procedures. Second part talks about measurement of the model scales.

Finally, the third section of the chapter refers to the statistical procedure that will be used to test the hypotheses in the next chapter. Specifically, the focus is on Structural Equation Modelling (SEM). Here, I discuss the suitability of SEM for the research and review some specific SEM models required to verify the causal relationships included in the hypotheses.

In the following chapter, the application of SEM to the data will allow to draw some conclusions about the causal relationships proposed in the hypotheses

CHAPTER 6. RESULTS OF THE EMPIRICAL RESEARCH

6.1. INTRODUCTION

In this chapter the quantitative analysis of the data and a discussion of the main results are described. Also a general overview of the questionnaire results is offered. Structural Equation Modelling methodology aims to achieve two objectives: a) to verify the validity of the measurement scales corresponding to the constructs included in this study and b) to contrast the research hypotheses stated in the previous chapters.

In the first section of the chapter, the results of several tests to check the construct validity of the scales used to measure the various concepts of this research are presented. Tests of dimensionality, reliability and validity are conducted. In the second section, the results of the estimation of the structural models are presented. The final section summarises the main findings of the chapter.

6.2. DESCRIPTIVE RESULTS

In this section a general overview of the questionnaire results is offered. For this purpose, the five main parts of the questionnaire have been considered:

- a) Internet use
- b) eID use
- c) eID Benefits
- d) eID foreign services
- e) Reasons for not use eID

6.2.1. Internet use

The main internet use is online banking; 43.76% of the surveyed declared using online banking More than once a week BUT less than every day. Followed by use of Social Media (i.e. Facebook) and Chat and instant messaging, where 33.56% and 31.91% respectively, declared using it every day.

If the mean values in a scale from 1 (never) to 5 (every day) are considered, only the three aspects indicated previously had a value over 3.

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The lowest use was for Interacting with law enforcement agencies and Interacting with medical professionals, where the surveyed declared that they Never use these services 70.03% and 60.74% respectively.

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	Never	More than once a year BUT less than once a month	More than once a month BUT less than once a week	More than once a week BUT less than every day	Every day	Mean	Std. Deviation
Online banking	7.22	5.15	28.48	<u>43.76</u>	15.40	<u>3.55</u>	1.04
Social Media i.e. Facebook	26.42	9.81	11.49	18.72	<u>33.56</u>	<u>3.23</u>	1.62
Chat and instant messaging	27.95	12.02	12.19	15.93	<u>31.91</u>	<u>3.12</u>	1.63
Making purchases	7.64	36.63	38.78	14.41	2.55	2.68	0.90
Business Social Media i.e. LinkedIn Personal	33.74	14.70	18.26	19.43	13.88	2.65	1.46
Exchanging confidential personal information	26.80	27.66	19.18	13.94	12.42	2.58	1.34

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Interacting with academic institutions	33.55	27.25	16.26	12.59	10.35	2.39	1.34
Interacting with national public administrations	23.22	47.43	16.15	7.97	5.23	2.25	1.06
Interacting with local public administrations	30.04	45.68	14.31	6.27	3.70	2.08	1.01
Interacting with tax authorities	22.27	60.49	11.29	4.31	1.64	2.03	0.81
Interacting with medical professionals	<u>60.74</u>	26.78	8.35	2.41	1.72	1.58	0.87
Interacting with law enforcement agencies	<u>70.03</u>	21.37	4.24	2.29	2.08	1.45	0.85

Table 6.1. Internet Use

6.2.2. eID use

Focussed in the eID use, 56.69% stated using eID. More than once a year BUT less than once a month (33.53%) or more than once a month BUT less than once a week (23.16%).

In connection with the different services analysed, and if the means value in a scale from 1 (never) to 5 (every day) are considered, there is not any service over 3. The higher values were obtained by: interactions with my bank (2.45) and interact with tax authorities (2.24). But for example in the case of interactions with my bank, 41.82% never used this service.

Respect eID use away from home country (on holiday or working abroad): 67.66% Never and 22.85% more than once a year BUT less than once a month, with a general mean of 1.48

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	Never	More than once a year BUT less than once a month	More than once a month BUT less than once a week	More than once a week BUT less than every day	Every day	Mean	Std. Deviation
Use eID in the last 12 months	12.03	<u>33.53</u>	<u>23.16</u>	17.59	13.69	<u>2.87</u>	1.23
I use my eID to secure interactions with my bank	41.82	11.95	14.72	22.26	9.25	<u>2.45</u>	1.44
I use my eID to interact with tax authorities	15.80	61.45	11.84	4.89	6.02	<u>2.24</u>	0.98
I use my eID for general access to secure business platforms	54.00	17.00	12.43	9.14	7.43	1.99	1.30
I use my eID for business registration	63.58	15.48	9.39	5.23	6.31	1.75	1.20

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I use my eID for accessing educational services	63.03	16.87	7.90	6.89	5.31	1.75	1.18
I use my eID to Secure notarised communication with business partners	69.38	13.78	7.35	4.35	5.14	1.62	1.12
I use my eID for accessing medical services such as authorising access to or viewing my medical records	66.36	19.99	7.61	3.06	2.99	1.56	0.97
Do you ever use your eID when away from your home country, for example, when on holiday or working abroad?	<u>67.66</u>	22.85	4.67	3.28	1.53	1.48	0.85

Table 6.2. Frequency of eID us

Tables 6.3. and 6.4. shows whether eID technology exists in the surveyed country and if they have an eID, respectively. Most of the people answered 'yes'.

	Frequency	Valid Percent
Yes	<u>1933</u>	<u>82.64</u>
No	406	17.36
TOTAL	2339	100.00

Table 6.3. Does this eIDENTITY technology exist in your country?

	Frequency	Valid Percent
Yes	<u>1577</u>	<u>81.71</u>
No	353	18.29
TOTAL	1930	100.00

Table 6.4. Do you have an eID?

The eID is most used for work (2.95) than for personal matters (2.38).

	N	Mean	Std. Deviation
I use my eID in connection with my work.	1371	<u>2.95</u>	1.68
I use my eID for personal matters, that is to say, NOT to do with work.	1393	2.38	1.44

Table 6.5. Mainly eID use

The main way to enhanced eID use is with a Greater range of applications and services available (4.14) and Standardised methods of usage across applications (4.06).

	N	Mean	Std. Deviation
Greater range of applications and services available	13 82	<u>4.14</u>	1.27
Standardised methods of usage across applications	13 81	4.06	1.26
Larger numbers of other people using eIDs	13 73	3.51	1.30

Table 6.6. Enhanced eID use

6.2.3. eID Benefits

In relation to the eID Benefits neither of the alternatives had a mark over 3. The two best

evaluated aspects were: It means I don't have to remember so many passwords (2.50) and Speeding up interactions (2.31).

eID Benefits	N	Me an	Std. Deviation
It means I don't have to remember so many passwords	13 88	<u>2.5</u> <u>0</u>	1.48
Speeding up interactions	13 85	2.3 1	1.46
Enables you to conduct activities remotely	13 82	2.2 2	1.47
Gives you greater confidence in your online dealings	13 82	2.2 0	1.41
Enables you to complete transactions that would otherwise require a written form	13 88	2.0 9	1.48

Table 6.7.eID Benefits

6.2.4. eID foreign services

The main priorities related to eID foreign services were: Secure interactions with banks based in other EU countries (3.55) and Accessing medical services such as authorising access to medical records or viewing my home based medical records when abroad (3.31). Moreover, two of them marked higher than the 3 other aspects: Accessing medical services (3.31);

General access to secure business platforms (3.18) and accessing educational services provided by another EU country (3.01).

eID foreign services priority	N	Me an	Std. Deviation
Secure interactions with banks based in other EU countries	13 54	<u>3.5</u> <u>5</u>	1.43
Accessing medical services such as authorising access to medical records or viewing my home based medical records when abroad	13 59	3.3 1	1.45
General access to secure business platforms	13 50	3.1 8	1.40
Accessing educational services provided by another EU country	13 56	3.0 1	1.43
Secure notarised communication with business partners based in other EU countries	13 53	2.7 7	1.43
Business registration in another EU country	13 53	2.5 7	1.45
Interacting with foreign tax authorities	13 59	2.4 8	1.54

Table 6.8.eID foreign services priority

6.2.5. Reasons for not use eID

Survey respondents highlighted four main reasons not to use eID: The scheme is too expensive (3.36), the

scheme is technically too complex (3.24), I do not know how to obtain an eID (3.20) and I do not trust the eID service or service provider (3.18).

Reasons for not use eID	N	Me an	Std. Deviation
The scheme is too expensive	7 0	<u>3.3</u> <u>6</u>	1.50
The scheme is technically too complex	7 2	<u>3.2</u> <u>4</u>	1.48
I do not know how to obtain an eID	7 1	<u>3.2</u> <u>0</u>	1.73
I do not trust the eID service or service provider	7 1	<u>3.1</u> <u>8</u>	1.51
I do not wish to provide the necessary identification documentation in order to Enrol	7 0	2.9 9	1.46
I don't want to compromise my privacy by disclosing private documents during the enrolment process	7 2	2.9 9	1.41
The enrolment process is too complex	7 0	2.9 3	1.53
There are few or no applications I could use an eID with	7 2	2.5 3	1.46
Overall there are too few benefits when compared to the effort / costs	7 2	2.4 6	1.43

Table 6.9.Reasons not to use eID

6.3. DIMENSIONALITY, RELIABILITY AND VALIDITY OF THE MODEL

It is conducted tests of dimensionality, reliability and validity for the whole model in this study.

Analyses of a scale's dimensionality consist of verifying whether the available data confirm the existence of the theoretical dimensions defined for a construct. These analyses can be performed by estimating several measurement models through CFA. By studying the model's fit, factor loadings and their statistical significance, conclusions on the appropriateness of the indicators to measure the associated latent variable can be drawn.

Reliability refers to consistency of test scores i.e., whether the application of a specific measure in different moments and contexts would provide the same results. Reliability indicators include Cronbach's alpha, as well as an index of composite reliability for research using SEM.

Validity is important because it can help determine what types of tests to use, and help to make sure

researchers are using methods that are not only ethical, and cost-effective, but also a method that truly measures the idea or construct in question. First, content validity, which reveals whether indicators associated to a construct are representative of the domain they are supposed to measure. The evaluation of content validity is not a statistical matter, but rather it depends on the researcher's opinion. Convergent validity denotes whether different indicators measuring the same concept are highly intercorrelated. Discriminant validity refers to the distinctiveness of the factors measured by different sets of indicators.

6.3.1. Dimensionality

In order to confirm the unidimensionality of the fifteen dimensions a Confirmatory Factor Analyses (CFA) was performed for the theoretical model. The overall chi squared for the adjusted models was statistically significant. Factor loadings and t-values are presented in Table 6.10. All item loadings are statistically significant. As can be observed, the overall fit of the model does not require additional items.

In this research, fifteen dimensions are obtained:

1. Perceived risk related with work
2. Perceived risk not related with work
3. Perceived security in online bank
4. Perceived security in personal transactions
5. Perceived security in business transactions
6. Perceived Privacy
7. Trust
8. Intention to use EID in home
9. Intention to use EID abroad
10. Perceived usefulness
11. Actual usage in online banking
12. Actual usage in public transactions
13. Actual usage for social media
14. Actual usage for other purposes
15. Actual usage of EID abroad.

Perceived risk related with work and perceived risk not related with work are dimensions of perceived risk. Perceived security in online bank, perceived security in personal transactions, perceived security in business transactions are dimensions of Perceived security. Intentions to use eID home and intention to use eID abroad are dimensions of intentions to use. Actual usage in online banking, actual usage in

public transactions, actual usage for social media and actual usage of eID abroad are dimensions of actual usage of eID

Items that make up each of the dimensions according to the factor loadings are shown below.

Item corresponding to perceived risk related with work:

I use my eID in connection with my work (1.00)

Item corresponding to perceived risk not related with work:

I use my eID for personal matters, NOT to do with work.(1.00)

Item corresponding to perceived security in online bank:

I use my eID to secure interactions with my bank (1.00)

Items corresponding to perceived security in business transactions are:

I use my eID for business registration (0.737)

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I use my eID for general access to secure business platforms (0.791)

I use my eID to Secure notarised communication with business partners (0.703)

Items corresponding to perceived security in personal transactions are:

I use my eID to interact with tax authorities (0.489)

I use my eID for accessing medical services such as authorising access to or viewing my medical records.(0.623)

I use my eID for accessing educational services. (0.692)

Items corresponding to perceived privacy are:

Greater range of applications and services available. (0.876)

Larger numbers of other people using eIDs. (0.609)

Standardised methods of usage across applications.(0.86)

Items corresponding to trust are:

Exchanging confidential personal

information. (1.00)

Items corresponding to intention to use eID in home are:

I have used more than once a year BUT less than once a month

Items corresponding to intention to use eID abroad are:

I have never used my eID abroad.

Items corresponding to perceived usefulness are:

Speeding up interactions. (0.754)

Gives you greater confidence in your online dealings. (0.833)

Enables you to complete transactions that would otherwise require a written form.(0.916)

Enables you to conduct activities remotely. (0.885)

It means I don't have to remember so many passwords. (0.59)

Items corresponding to actual usage of eID in online banking are:

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Online banking (0.491)

Making purchases(0.638)

Items corresponding to actual usage actual usage in public transactions are:

Interacting with tax authorities. (0.638)

Interacting with national public administrations. (0.798)

Interacting with local public administrations. (0.783)

Items corresponding to actual usage for social media are:

Chat and instant messaging. (0.569)

Business Social Media i.e. LinkedIn. (0.504)

Personal Social Media i.e. Facebook. (0.766)

Items corresponding to actual usage for other purposes are:

Interacting with medical professionals.(0.688)

Interacting with law enforcement agencies. (0.76)

Interacting with academic institutions.(0.456)

Items corresponding to actual usage of EID abroad are:

Interacting with foreign tax authorities.(0.615)

Business registration in another EU country.

(0.789)

Secure notarised communication with business partners based in other EU countries.(0.806)

General access to secure business platforms.
(0.738)

Secure interactions with banks based in other EU countries.(0.637)

Accessing medical services such as authorising access to medical records or viewing my home based medical records when abroad. (0.557)

Accessing educational services provided by another EU country.(0.641)

Items	Factor t-loading value
Perceived Risk	
Perceived risk related with work	
<i>I use my eID in connection with my work.</i>	1 fix
Perceived risk not related with work	
<i>I use my eID for personal matters, NOT to do with work.</i>	1 fix
Perceived Security	
Perceived security in online bank	
<i>I use my eID to secure interactions with my bank</i>	1 fix
Perceived security in business transactions	
<i>I use my eID for business registration</i>	0.737 fix
<i>I use my eID for general access to secure business platforms</i>	0.791 22.12
<i>I use my eID to Secure notarised communication with business partners</i>	0.703 17.40
Perceived security in personal transactions	
<i>I use my eID to interact with tax authorities</i>	0.489 fix
<i>I use my eID for accessing medical services such as authorising access to or viewing my medical records</i>	0.623 9.87
<i>I use my eID for accessing educational services</i>	0.692 11.27
Perceived Privacy	
<i>Greater range of applications and services available</i>	0.876 fix
<i>Larger numbers of other people using eIDs</i>	0.609 18.57
<i>Standardised methods of usage across applications</i>	0.86 23.88

Trust		
<i>Exchanging confidential personal information</i>	1	fix
Intention to Use		
Intention to use EID in home		
<i>I have used more than once a year BUT less than once a month</i>	1	fix
Intention to use EID abroad		
<i>I have never used my EID abroad</i>	1	fix
Perceived usefulness		
<i>Speeding up interactions</i>	0.754	fix
<i>Gives you greater confidence in your online dealings</i>	0.833	31.22
<i>Enables you to complete transactions that would otherwise require a written Form</i>	0.916	34.36
<i>Enables you to conduct activities remotely</i>	0.885	34.75
<i>It means I don't have to remember so many passwords</i>	0.59	20.62
Actual usage of EID at home		
Actual usage in online banking		
<i>Online banking</i>	0.491	fix
<i>Making purchases</i>	0.607	8.37
Actual usage in public transactions		
<i>Interacting with tax authorities</i>	0.638	fix
<i>Interacting with national public administrations</i>	0.798	13.87
<i>Interacting with local public administrations</i>	0.783	13.44
Actual usage for social media		
<i>Chat and instant messaging</i>	0.569	11.41
<i>Business Social Media i.e. LinkedIn</i>	0.504	fix
<i>Personal Social Media i.e. Facebook</i>	0.766	11.74
Actual usage for other purposes		

<i>Interacting with medical professionals</i>	0.688	11.93
<i>Interacting with law enforcement agencies</i>	0.76	11.84
<i>Interacting with academic institutions</i>	0.456	fix
Actual usage of EID abroad		
<i>Interacting with foreign tax authorities</i>	0.615	Fix
<i>Business registration in another EU country</i>	0.789	24.87
<i>Secure notarised communication with business partners based in other EU countries</i>	0.806	23.86
<i>General access to secure business platforms</i>	0.637	17.92
<i>Secure interactions with banks based in other EU countries</i>	0.557	16.48
<i>Accessing medical services such as authorising access to medical records</i>		
<i>Accessing educational services provided by another EU country</i>	0.641	19.50

Table 6.10. Analysis of the dimensionality, reliability and validity of the scales (Fully standardized solution).

CR: Composite reliability.

AVE: Average variance extracted

After the clarification of the scale, a model that meets all requirements of dimensionality, reliability and validity is obtained, as shown .As can be

observed in Table 6.11 the probability associated with chi-squared reaches a value higher than 0.05 (0.35488), indicating an overall good fit of the scale (Jöreskog & Sörbom,1996).

Chi squared	537.4889
df	526
p	0.35488
RMSEA	0.004
NFI	0.999
CFI	0.999

6.11. Fit of the Model

6.3.2. Reliability

To test the reliability of the proposed model, measure of the composite reliability of the model was analysed. The composite reliability index takes into account the relative importance of each indicator in the factor to which it belongs. The composite reliability of the scales. The composite reliability of the

each dimension was higher than 0.6 which makes the model significant according to Bagozzi. (Bagozzi, 1988)

6.3.3. Validity

6.3.3.1. Convergent validity

The test for convergent validity was performed by means of the Bentler-Bonett coefficient, which was above 0.9 in the model. This can be interpreted as evidence of the scales' convergent validity.

Convergent validity is demonstrated for two reasons. Firstly, the factor loadings are significant and greater than 0.6 (Bagozzi, 1980) and the second because the average variance extracted (AVE) for each factor is always greater than 0.5 (Fornell, 1981). The reliability of the scale is shown as composed reliability indices of each of the obtained dimensions are greater than 0.6 (Bagozzi, 1988).

Chapter 6. Results of the Empirical Research

Items	CR	AVE
Perceived risk related with work	1	1
Perceived risk not related with work	1	1
Perceived security in online bank	1	1
Perceived security in personal transactions	0.79	0.55
Perceived security in business transactions	0.77	0.52
Perceived Privacy	0.83	0.63
Trust	1	1
Intention to use EID in home	1	1
Intention to use EID abroad	1	1
Perceived usefulness	0.95	0.70
Actual usage in online banking	0.68	0.51
Actual usage in public transactions	0.79	0.55
Actual usage for social media	0.75	0.52
Actual usage for other purposes	0.75	0.53

Actual usage of EID abroad	0.94	0.55
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Table 6.12. Analysis of the Measurements

6.3.3.2. Discriminant Validity

Table 6.12. discriminant validity of the constructs considered in the model, which is evaluated through the average variance extracted-AVE (Fornell, 1981) are shown. In order to do a construct should share more variance with its indicators with other constructs in the model. This happens when the square root of the AVE between each pair of factors is greater than the estimated correlation between these factors, as happens in this case which confirms its discriminant validity.

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Perceived risk related with work	1														
Perceived risk not related with work	-0.11	1.00													
Perceived security in online bank	-0.10	0.04	1.00												
Perceived security in business trans	-0.25	0.13	0.45	0.74											
Perceived security in personal trans	-0.09	0.06	0.56	0.64	0.75										
Perceived privacy	-0.02	0.06	0.01	0.12	0.06	0.79									
Trust	-0.10	0.01	0.08	0.19	0.23	0.07	1.00								
Intention to use E-id in home	-0.28	0.07	0.40	0.46	0.38	0.13	0.17	1.00							
Intention to use E-id abroad	-0.14	0.04	0.37	0.45	0.39	0.01	0.15	0.40	1.00						
Perceived usefulness	0.18	0.41	0.001	0.04	0.05	0.05	0.01	-0.08	-0.03	0.84					
Actual usage in online banking	-0.05	0.002	0.33	0.30	0.36	0.13	0.35	0.26	0.23	0.00	0.51				
Actual usage in public transaction	-0.11	0.08	0.28	0.43	0.52	0.03	0.33	0.35	0.30	0.03	0.46	0.74			
Actual usage for social media	-0.09	0.06	0.05	0.13	0.18	0.09	0.28	0.09	0.14	0.07	0.40	0.17	0.62		
Actual usage for other purposes	-0.11	0.08	0.30	0.48	0.67	0.07	0.32	0.25	0.41	0.06	0.47	0.69	0.27	0.65	
Actual usage of E-id abroad	-0.06	0.02	0.11	0.29	0.28	0.28	0.14	0.13	0.19	-0.02	0.19	0.23	0.18	0.26	0.74

Below the diagonal: correlation estimated between the factors

Diagonal: square root of AVE

6.4. ANALYSIS OF THE STRUCTURAL MODELS

This section focuses on the parameters of the structural models, as a medium to justify the causal relationships included in the hypotheses. This section is organised according to the research hypotheses posited in Chapter 4. Following the two-stage approach (two-step) by Anderson and Gerbing (1988), once estimated the measurement model, we proceed to estimate the structural model through the application of path analysis with latent variables (Jöreskog, 1996), with which to contrast the theoretical hypotheses raised. The results of the structural model shown, the model fit is adequate since the probability associated with chi-square statistic is greater than 0.05 (0.354). Then the effects of the variables included in the model are analysed.

6.4.1. Perceived risk and Trust

One of the first of relationships that are raised as hypothesis in this research focuses on the influence of perceived risk on the trust of people towards using eID. The results led to two different dimensions of

perceived risk, work related and non-work related. Although the theory of Yousafazi determined perceived risk as a result of trust, results have shown significant and negative effect on trust. (Yousafazi, 2003) Perceived risk arises more when eID is used for work-related matters, such as business transactions or exchanging confidential information for an online banking transaction. The individual's perception of risk is important when considering acquiring a new technology or service. (Laforet and Li 2005)

Whereas perceived risk when used for non-work related matters such as social media, chat or instant messaging did not show significant effect on trust. Consequently, this analysis allows ratify the fulfilment of the first of the hypotheses on the line where the work of Giffin, (1967), Good (1988) Luhmann, (1989) March and Shapira (1987) and Riker, (1974), perceived risk is crucially important in order to understand the effect of trust.

6.4.2. Perceived Security and Trust

In the second hypothesis is considered the influence of the perceived security on trust. Addition to the main hypothesis, the results led to three different dimensions of perceived security: perceived security using online banking service, using on business transactions and finally on personal transactions.

Table 6.13 demonstrates the overall effect of perceived security on trust. As can be seen perceived security has significant effects on trust while its used for online banking (0.77) and for business transactions (0.26) whereas, no significant relation while used for personal transactions (0.001). The work of authors such as Furnell and Karweni (1999), Bestavros (2000) corresponds with the results as the greatest challenge to the electronic banking sector is winning the trust of customers over the issues of security.

In a similar vein, Lee and Turban (2001) also postulated that "security effectiveness" as a contextual factor that will have a significant impact

on trust .Therefore the second hypothesis is met partially.

6.4.3. Perceived Privacy and Trust

Following perceived risk and security, another major concepts has been tested: perceived privacy. Perceived privacy is often is related with confidentially. As by the definition privacy is the consumer's ability to control presence of other people in the environment during a transaction. (Goodwin, 1991)There is thus a risk of loss of confidentiality, which is a significant factor in building trust (Culnan and Armstrong, 1999). Hoffman's research reveals that lack of trust arises from cyber-consumers' perceived lack of control over the access others have to their personal information during the online navigation process. (Hoffman, 1999)

The results showed not so significant relationship between perceived privacy and trust with (0.0061) factor loading. However the hypothesis is met partially. This is due to having lack of items to measure the relationships.

6.4.4. Perceived Usefulness and Intention to Use

The main model that has led to the theoretical model of this research is technology acceptance model. One of its main variables perceived usefulness has been defined as "the degree of belief that the use of certain system will increase the individual's performance" by Davis (1989) Followed by behavioural intention is the indication of the individual's desires and efforts to realize a behaviour.

The results were partially significant for explaining the relation between perceived usefulness and intention to use eID. However there was a division between intentions to use of eID in once's home country (0.40), and abroad (0.058). Concluding that people believe that they are benefiting more of the usage of eID while in their home country than abroad.

6.4.5. Trust and Intention to Use

Previous research has shown that trusting perceptions directly or indirectly influence the intentions to purchase (Grazioli and Jarvenpaa, 2000). The results like in perceived usefulness case led to a division between home country and abroad usage of eID. Both results were significant enough to meet the hypotheses with a factor loading at home's country (0.53) and abroad (0.26)

6.4.6. Intention to Use and Actual Usage

Warshaw & Davis (1985) suggest that present intention may not be the direct and effective determinant of future behaviour. Focusing on the variability in the intention-behaviour relationship, Bevir also suggests that intentions are not always tightly linked to what people really do. (Bevir, 2003) But in this study the relationship between intention to use and actual usage of EID are resulted in five dimensions: online banking (0.60), business transactions (1.08), social media (0.04), for other purposes (0.81) and lastly usage at abroad (0.31). This

allows us to conclude that the hypotheses are met significantly.

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CAUSAL RELATIONSHIPS	FACTOR LOADING	t-value	Hypothesis
PERCEIVED RISK EFFECTS			
Perceived risk related with work→Trust	-0.084	-2.60**	Yes
Perceived risk not related with work→Trust	-0.011	-0.36*	Partially
PERCEIVED SECURITY EFFECTS			
Perceived security in online banking→Trust	-0.077	-1.97	Yes
Perceives security in personal transactions→Trust	0.001	0.008***	Partially
Perceived security in business transactions→Trust	0.261	2.90	Yes
PERCEIVED PRIVACY EFFECTS			
Perceived Privacy→Trust	0.061	1.80	Partially
TRUST EFFECTS			

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Trust→Intention to Use of EID at home	0.532	5.59	Yes
Trust→Intention to Use of EID abroad	0.266	4.82	Yes
Trust→Actual Usage of EID in online banking	0.017	0.18**	Partially
Trust→Actual usage of EID in public transactions	-0.190	-1.31*	Partially
Trust→Actual usage of eID in for social media	0.289	5.23	Yes
Trust→Actual usage of eID for other purposes	-0.126	-1.12	Partially
Trust→Actual usage of EID abroad	0.056	0.32	Partially
PERCEIVED USEFULNESS EFFECTS			
Perceived usefulness→Intention to Use eID at home	0.40	0.88*	Partially
Perceived usefulness→Intention to Use eID abroad	-0.058	-1.04	Partially
INTENTION TO USE EFFECTS			
Intention to use EID at home→Actual usage	0.605	4.04	Yes

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of eID in online banking			
Intention to use EID at home→Actual usage of eID business transactions	1.088	5.36	Yes
Intention to use EID at home→Actual usage of eID in social media	-0.047	-0.73*	Partially
Intention to use EID at home→Actual usage of eID for other purposes	0.813	4.81	Yes
Intention to use abroad→Actual usage of EID abroad	0.315	0.48*	Partially

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 6.13. Casual Relationships and Hypothesis Testing

Chapter 6. Results of the Empirical Research

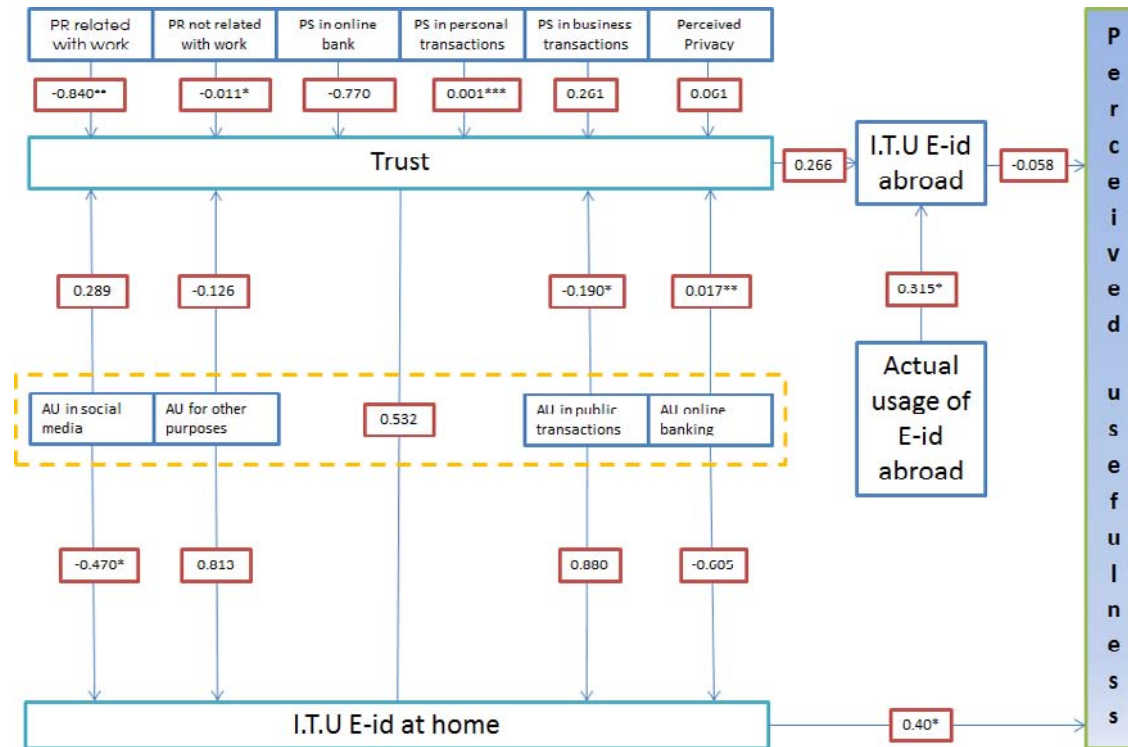


Figure 6.1.The Conceptual Model Testing

CHAPTER 7. DISCUSSIONS

7.1. INTRODUCTION

Overall, all of the parts in this dissertation are successfully documented and coordinated. Introduction part explains research background, justification, research objectives, and scope of the thesis and also the importance of it. Theoretical Section discuss about the focuses more on conducting literature review and documented them accordingly. In this part the conceptual model and hypotheses are introduced. Empirical Section discussed the research findings and system design while the implementation and testing.

The general purpose of this dissertation was to analyse the reasons for not to use more efficiently the electronic identification and propose a conceptual model based on technology acceptance model. In order to achieve this, an empirical study on a sample of 3359 EU citizens was carried out. Specifically, focus was on people who had access to electronic identification in their country, which led to 1156

people in the sample. The literature review provided in this research and the application of SEM models to the data leads to several conclusions that will be explained in this chapter. The need for information, social roles and characteristics and outer environment affect the consumer's decisions. There are social, environmental and personal barriers that prevent or make it difficult to pass through the information that has to be received. In non-profit marketing, complexity of information and the enrichment of channels like mass media and social media make it harder for an individual to decide whether to support the cause (or not). In short, TAM, asserts that behavioural intention is the primary factor determining an individual's acceptance or refusal to use information technologies. In other words, it is the primary factor determining actual use and that the behavioural intention of an individual has a significant role on his/her tendencies towards the use of these technologies. TAM states that a person's perceptions towards the usefulness of utilization and ease of use of information and communication Technologies have important effects in forming the/an individual's tendencies to use information and communication technologies. An individual's

intention of use is indirectly affected by perceptions of usefulness and ease of use and these indirect effects come about through the individual's tendency factor towards use.

Firstly, the concept of technology acceptance model is been reviewed in order to have a scientific understanding of people's resistance to accept new technologies. This model has been used greatly in many field of studies however there has not been any related with electronic identification.

Secondly, in this research the characteristics of trust and related concepts such as perceived risk, security and privacy were added as adverse reasons to usage of electronic identification. Explicitly, the research was centralized on two main questions: a) what are the reasons that disrupt the usage of electronic identification in a wider range? b) How to sustain its usage in long term? Answers to these questions may help to advance the STORK 2.0 project in future.

In this chapter, I explain the conclusions of the present study in greater detail. Some of the limitations of the study together with future lines of research to come out of these results are also discussed.

7.2. MAIN CONCLUSIONS OF THE RESEARCH

Through the theoretical review provided in Chapters 1 to 4 and the empirical study ensured in a sample of EU citizens in Chapters 5 and 6 now the discussion will be extended to which this research has fulfilled the objectives set out at the beginning of the dissertation.

7.2.1. Conceptualizing Of TAM: Perceived Usefulness, Intention to Use and Actual Usage

The need for information, social roles and characteristics and outer environment affect the consumer's decisions. There are social, environmental and personal barriers that prevent or make it difficult to pass through the information that has to be received. In online marketing, complexity of information and the enrichment of channels make it

harder for an individual to decide whether to engage with it or not.

The analysis of the grounds of TAM encompasses examining the TRA that assumes that individuals are usually rational and will consider the implications of their actions prior to deciding whether to perform a given behaviour (Ajzen & Fishbein, 1980). From the review of relevant studies in the IS literature, it has been concluded that TAM is made up of three clusters, namely: a) perceived usefulness of a technology usage b) ease of use of the usage of that technology and c) actual behaviour. Each configuration denotes a practical logic that explains the adoption of technologies. Concerning this, the proposal has been considered these configurations to represent practical approach that captures the correlation between a set of practices.

This conception of TAM was substantiated in the empirical research. Through the application of the Confirmatory Factor Analysis (CFA) technique in the sample, the TAM was demonstrated.

Laterally, these results supported to the usage of TAM in order to explain the behaviour of people who are using the eID. From this perspective, usage of eID is characterised by three issues. Firstly, people that adopt technologies gave importance to the fact that “subjective probability that using a specific application system will increase his or her job” (Davis, 1989) The subjects stated that using eID would speed up their interactions and enables to complete transactions much more easily. These results concur with those of Yousafazi (2003), Lee (2009), Tsei (2014) or Porter (2006), among many others, who demonstrated the appropriateness of the TAM to understand the intention and actual usage behaviour of people in online environment.

Although, the questionnaire included items to measure perceived ease of use like as it's shown in the conceptual model, the obtained number of responds were not sufficient to draw a conclusion. Perceived ease of use is the degree to which a person believes that using a particular system would be free from effort (Davis 1989). The addition of this variable was due to vast amount of previous studies

such as Gefen (2003), McKnight (2002), Pavlou (2003) and Luarn (2005). This will be explained in limitations.

7.2.2. Trust and Its Components: Perceived Risk, Perceived Security and Perceived Privacy

Much as trust's import, trust research efforts are sometimes hard to follow and difficult to compare with each other because the term trust is defined in a plenitude of different ways such that researchers have wondered at how confusing the term has become. (McKnight, 2002) Trust has been conceptualized in different fields just as marketing, information science or psychology. Since 1900's the interest in the notion of trust effect on consumer's behaviour has been emerging. Nonetheless trust in electronic banking is a new and emerging area of interest in the field of marketing of financial services research. Extant literature on trust related to online banking is scarce and focused on more general issues of e-commerce. (Yousafazi, 2003)

Following the suggestions of various scholars (Ling et al 2011, Tsiakis, 2012, Featherman 2010). I have sought

to fill this research gap by conceptualising g trust from three aspects: perceived risk, perceived security and perceived privacy.

The application of Structural Equation Modelling to the data confirmed the proposed the negative influence of perceived risk, security and privacy to the trust thus intention to use of electronic identification. The first dimension of trust (perceived risk) refers to an uncertainty regarding possible negative consequences of using a product or service. The second dimension of trust (perceived security) indicates the customers' perception of the degree of protection against the abuse or fraud his/her disclosure.(Kalakota,1997) The third dimension of trust (perceived privacy) refers to , which refers to customer's perception regarding their ability to monitor and control the information about themselves(Yousafazi,2003)

Despite the general conceptualisation of the general model, several tests confirmed its construct validity and consequently, the correspondence between the

indicators and the theoretical construct to be measured.

According to Mayer it is unclear whether risk is an antecedent to trust, is trust, or an outcome of trust. (Mayer, 1995). Boon defined the relation between risk and trust as positive expectations about another's motives with respect to oneself in situations entailing risk. (Boon, 1991). In this study the proposed hypothesis was that perceived risk effects trust negatively, that is to say, people will tend to trust and use electronic identification when there are risk more risks involved. The results of the CFA would let us to have a division between perceived risks involved with things work related usage of eID with non-work related one. Following this logic, the hypotheses in this research established causal relationships between perceived risk and trust. In order to test these hypotheses, several structural equations were estimated. Perceived risk related with work was empirically corroborated significantly, while non-related was not that significant. The results of these analyses confirm that the one of the main configurations that determine trust and usage of electronic identification is perceived risk.

7.2.2.1. Perceived Security Influence on Trust and Usage of eID

Kim et al, investigate the impact of perceived security on both trust and perceived risk. The result of their study concluded that perceived security is an important antecedent of both trust and risk. (Kim, 2011) The proposed hypothesis in this research stated a negative relationship between perceived security and trust, in other words, people will tend to trust and use electronic identification when they do not feel secure. The results of the CFA would let us to have three way division; a) perceived security while using the eID for online banking, b) perceived security while using eID for business transactions such as tax or legal issues and c) perceived security while using eID for personal transactions. Results demonstrated that perceived security effects the trust hence the usage of eID while it is used for business and online banking purposes. However, when it comes to personal transactions the result was not significant enough to conclude a negative relationships. Following this logic, the hypotheses in this research established causal relationships between perceived security and

trust. To sum up, perceived security effects trust negatively and this was empirically tested.

7.2.2.2. Perceived Privacy Influence on Trust and Usage of eID

Consumers who do business with organizations are highly concerned and vulnerable as their personal data can be compromised and misused. These growing privacy concerns have led to an even greater emphasis on risk perception in decision-making as regards data disclosure. Therefore, consumers with higher privacy concerns will perceive higher risks in giving their personal identity. (Miltgen, 2013) The stated hypothesis suggests that perceived privacy effects trust negatively. Drawing from the relation, people would have less tendency to use eID when their perception is towards losing their privacy. The results of empirical tests were not that significant to draw a general conclusion. This is also due to lack of items to measure the relation between variables. In future research should be included more items.

7.3. LIMITATIONS AND FUTURE LINE OF RESEARCH

Despite the conclusions about linkages between technology acceptance, trust and actual behaviour this research presents certain limitations with respect to theoretical questions, as well as to methodological issues. In this section, some of the weaknesses of the study, together with ideas for future research that may help to solve the shortcomings of the dissertation are discussed.

Firstly, although the conceptualisation of TAM in order to sustain the usage of electronic identification is used, an interesting line of research could be to integrate a different perspective into the model. Future research should consider the role perceived ease of use and perceived usefulness together as combination in order to explain the intention to use of eID.

Other limitations of the study refer to the methodology employed in the empirical research. Regarding data collection, sample's opinion may better conceptualised with more items in the

questionnaire for instance in case of perceived ease of use. The time dedicated to this dissertation was initially 2 years, which resulted quite challenging at the end for researcher. A longer period of time could enrich the study with more concretion.

Another limitation of the present study refers to the analyses of convergent and discriminant validity of the measurement scales. While convergent and discriminant validity created results, the model was quite large in order to get results. Future research should divide the model into scales to get concrete results.

Additionally, the database did not give enough information to conclude the moderator effect of culture shown as in the structural model. In future line of research, Hofstede's dimensions can be considered as a moderator effect in order to understand the cultural behavioural differences with the usage of electronic identification.

Lack of prior research studies on the electronic identification was another limitation of the study.

Although the results of the STORK projects are publicly available, there has not been any research in the line of electronic identification. For future investigations, this dissertation hope to serve as a reference.

Electronic identification is an innovation. Therefore, the new technologies such as smartwatches or any application that will require secure identification will benefit from the understanding of the factors that are subject of this dissertation.

This research will contribute to the realization of a single European electronic identification and authentication area by; building on the results of STORK project and establishing interoperability of different approaches at national and EU level. As well as for persons, eID for legal entities and the facilities to mandate and establish a range of pan-European online banking services supporting national eIDs hence broadening eID acceptance within the community and enable business to establish bank accounts and mandates electronically across Europe thus supporting the creation of the digital single market equal treatment at national & European level

in dealing with PAs reduction of administrative burdens for cross border public services . It is hope to have a clear impact on government's common online procedure also for the foreign operators avoid frauds improved, secure & faster services for businesses and lastly better functioning of the European Single Market facilitation of company mobility in the EU enhancement of the public services for business in general.

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Appendix

Questionnaire

Thank you for agreeing to fill in this questionnaire.

It will be valuable for us in helping us understand what we need to do, in order to make sure the results of STORK 2.0 are widely adopted.

There are 24 questions in this survey.

Geographic Data

1) Please select the country in which you live.

- 1) Austria
- 2) Belgium
- 3) Bulgaria
- 4) Cyprus
- 5) Czech Republic
- 6) Denmark
- 7) Estonia
- 8) Finland
- 9) France
- 10) Germany
- 11) Greece
- 12) Hungary
- 13) Iceland
- 14) Ireland
- 15) Italy
- 16) Latvia
- 17) Lithuania
- 18) Luxembourg
- 19) Malta

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- 20) Netherlands
- 21) Poland
- 22) Portugal
- 23) Romania
- 24) Slovakia
- 25) Spain
- 26) Sweden
- 27) Switzerland
- 28) Turkey
- 29) United Kingdom
- 30) Other

2) What do you currently use the Internet for? In the context of services for which you have to “log-on” to, what do you currently use the Internet for? For each service below, please indicate how frequently you use the online service.

From:

A= never

B= more than once a year BUT less than once a month

C= more than once a month BUT less than once a week

D= more than once a week BUT less than every day

E= every day

Please choose the appropriate response for each item:

1 2 3 4 5

Online banking

Appendix

Making purchases
Exchanging confidential personal information
Interacting with tax authorities
Interacting with national public administrations
Interacting with local public administrations
Business Social Media i.e. LinkedIn
Peersonal Social Media i.e. Facebook
Interacting with academic institutions
Chat and instant messaging
Interacting with medical professionals
Interacting with law enforcement agencies

3) In the context of services for which you have to 'log-on' to, are there any other services not listed above, that you currently use the internet to Access? Please list as many as you can think of, below.

Please write your answer here:

Please read the following text carefully.

An "Electronic Identity" is a means for people to provide electronically that they are who they say they are and thus gain Access to services. The EIDENTITY allows a citizen, business or an

administration to be distinguished from any other when being online.

Citizens, businesses and administrations face common problems regarding their electronic presence. They all need to have an electronic presence, protected from abuse and misuses, confirming unequivocally who they are in electronic transactions. They all need to have available descriptions of themselves. Whether it is a citizen filling in an online administrative form, a business offering a service or preparing a tender, or an administration wishing to share information, they should all be able to dispense with the time-wasting and cost involved in forever answering the same questions in ever more forms.

The ability to link a set of information to a user (citizen, business, administration) and the effective and secure handling of data are essential to numerous different interactions. To this end, organisational and technical infrastructures are developed to define, designate and administer the identity related to specific group of people, such as customers, patients or citizens. These infrastructures are identity management systems, handling eIdentities. These can be issued by the government or private sector organisations.

4) Does this eIDENTITY technology exist in your country?*

Please choose only one of the following:

- 1) Yes
- 2) No

5) Do you have an eID?*

Appendix

Only answer this question if the following conditions are met:

*Answer was Y 'Yes' at question '4 [leID01]' (Does this IDENTITY technology exist in your country?)

- 1) Yes
- 2) No

You have told us that you have an eID, so please answer the following questions in this context.

6) You have told us that you have an eID. On average how frequently have you used your eID in the last 12 months?

Please choose only one of the following:

- 1) Never
- 2) More than once a year BUT less than once a month
- 3) More than once a month BUT less than once a week
- 4) More than once a week BUT less than everyday
- 5) Every day

7) In which situations do you mainly use your eID?

For each statement below please indicate how strongly you agree.

A= Strongly agree E= Strongly disagree

Only answer this question if the following conditions are met:

Appendix

*answer was Y'Yes' at question '5 [leID02]' (Do you have an eID?)

Please choose the appropriate response for each item:

A B C D E

I use my eID in connection with my work.

I use my eID for personal matters, that is to say, NOT to do with work.

8) You have told us that you have an eID. What kind of services do you currently use it for?

For each service below, please indicate how frequently you use the online service.

A= never

B= more than once a year BUT less than once a month

C= more than once a month BUT less than once a week

D= more than once a week BUT less than every day

E= every day

Only answer this question if the following conditions are met:

*Answer was Y'Yes' at question '5 [leID02]' (Do you have an eID?)

Please choose the appropriate response for each item:

Appendix

A B C D E

I use my eID to interact with tax authorities

I use my eID to secure interactions with my bank

I use my eID for business registration

I use my eID for general Access to secure business platforms

I use my eID for accessing medical services such as authorising access to or viewing my medical records

I use my eID for accessing educational services

I use my eID to secure notarised communication with business partners

9) You have told us that you have an eID. Are there any other services you currently use it for on a frequent basis, which are not listed above?

Please list them below.

Only answer this question if the following conditions are met:

*Answer was Y'Yes' at question '5 [leID02]' (Do you have an eID?)

Please write your answer here:

10) Thinking about your use of your eID, do you think it is of benefit to you? For each statement below, please indicate how strongly you agree.

A= strongly agree

B= strongly disagree

Appendix

Only answer this question if the following conditions are met:

*Answer was Y'Yes' at question '5[leID02]' (Do you have an eID?)

Please choose the appropriate response for each item:

A B C D E

Speeding up interactions

Gives you greater confidence in your online dealings

Enables you to complete transactions that would otherwise require a written form

Enables you to conduct activities remotely

It means I don't have to remember so many passwords

11) You have told us that you have an eID. How do you think the use of your eID could be enhanced? Please rank the following in the level of importance.

A=Not important at all E= Very important

Only answer this question if the following conditions are met:

*Answer was Y'Yes' at question '5[leID02]' (Do you have an eID?)

Please choose the appropriate response for each item:

A B C D E

Greater range of applications and services available

Larger number of other people using eIDs

Standardised methods of usage across applications

12) Do you ever use your eID when away from your home country, for example, when on holiday or working abroad?

Only answer this question if the following conditions are met: *Answer was Y'Yes' at question '5[leID02]' (Do you have an eID?)

Please choose only one of the following:

- 1) never
- 2) more than once a year BUT less than once a month
- 3) more than once a month BUT less than once a week
- 4) more than once a week BUT less than every day
- 5) every day

13) What would be your highest priority foreign services to Access by using your eID? Please rank the following services in order of priority.

A= lowest priority E= highest priority

Only answer this question if the following conditions are met:

*Answer was Y'Yes' at question '5[leID02]' (Do you have an eID?)

Appendix

Please choose the appropriate response for each item:

A B C D E

Interacting with foreign tax authorities
Business registration in another EU country
Secure notarised communication with business partners based in other EU countries
General access to secure business platforms
Secure interactions with banks based in other EU countries
Accessing medical services such as authorising
Access to medical reports or viewing my home based medical reports when abroad
Accessing educational services provided by another EU country

14) Are there any other foreign services that you would like to access via your eID? Please list them in order of priority.

Only answer this question if the following conditions are met:

*Answer was Y'Yes' at question '5[leID02]' (Do you have an eID?)

Please write your answers here:

15) You have told us your country / region has some form of eID scheme but that you do not use it. Please tell us why by responding following statements.

Appendix

A= strongly agree E= strongly disagree

Only answer this question if the following conditions are met:

*Answer was N'No' at question '5[leID02]' (Do you have an eID?)

Please choose the appropriate response for each item:

A B C D E

The scheme is technically too complex

The enrolment process is too complex

I do not know how to obtain an eID

I do not wish to provide the necessary identification documentation in order to enrol

I do not trust the eID service or service provider

The scheme is too expensive

There are few or no applications I could use an eID with

Overall there are too few benefits when compared to effort / costs

I don't want to compromise my privacy by disclosing private documents during the enrolment process

Demographic Data

Please tell us about yourself by answering the questions below

16) Please tell us your age. Please choose only one of the following:

1) Under 18

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- 2) 18 to 25
- 3) 26 to 35
- 4) 36 to 45
- 5) 46 to 55
- 6) 56 to 65
- 7) 66 to 75
- 8) Over 76

17) Please tell us your gender. Please choose only one of the following:

- 1) Female
- 2) Male

18) Please tell us your current marital status. Please choose only one of the following:

- 1) Married
- 2) Divorced
- 3) Widowed
- 4) Separated
- 5) Single
- 6) A member of an unmarried couple

19) Do you have children under 18 years of age?
Please choose only one of the following:

- 1) Yes
- 2) No

20) Please tell us your current employment status.
Please choose only one of the following:

- 1) Employed for wages
- 2) Self-employed

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- 3) Out of work for more than 1 year
- 4) Out of work for less than 1 year
- 5) A home-maker
- 6) A student
- 7) Retired
- 8) Unable to work
- 9) Other

21) Which of the following statements best describes your current or most recent employed post? Please choose only one of the following:

- 1) Higher managerial post
- 2) Higher Professional post
- 3) Middle managerial post
- 4) Middle Professional post
- 5) Lower supervisory and technical
- 6) Clerical, sales, and service post

22) Which of the following statements best describes the size of your current or most recent employer? Please choose only one of the following:

- 1) Micro-entity organisation with up to 10 employees
- 2) Small organisation with up to 50 workers
- 3) Medium-sized organisation with up to 250 employees
- 4) Large organisation – with over 250 employees

23) Occupation. Please indicate the closest match to your field of work. Please choose only one of the following:

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- 1) Forestry and Fishing
- 2) Mining and Quarrying
- 3) Other Agro-Industries
- 4) Nuclear Energy, Electricity and Alternative Fuels
- 5) Oil, Gas and Coal
- 6) Water Companies
- 7) Other Energy and Utilities
- 8) Aerospace Equipment
- 9) Chemicals and Chemical Products
- 10) Defence Industries
- 11) Electronics and Electronic Engineering
- 12) Food, Drink and Tobacco
- 13) Glass and Ceramics
- 14) High-Tech Industries
- 15) Household Products and Appliances
- 16) Machine Tools and Other Machinery
- 17) Metals and Metal Products
- 18) Mineral Products
- 19) Motor Vehicles
- 20) Office Machinery, Computers and Electrical Products
- 21) Paper, Paper Products and Packaging
- 22) Pharmaceuticals and Toiletries
- 23) Rubber and Plastics
- 24) Textile, Clothing and Footwear
- 25) Timber and Furniture
- 26) Toys and Sports Goods
- 27) Other Manufacturing
- 28) Arts
- 29) Banking and Financial Institutions
- 30) Charities and Not-for-profit Organisations
- 31) Hotels, Leisure and Entertainment
- 32) Insurance

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- 33) Legal services
- 34) Libraries and Information Services
- 35) Property Services and Architecture
- 36) Professional Bodies, Housing Associations and Unions
- 37) Retail/Wholesale Trade
- 38) Sanitation, Refuse and Sewage Disposal
- 39) Tourism and Travel
- 40) Transport: Rail, Air, and Shipping Companies
- 41) Warehousing
- 42) Other services
- 43) Civil Engineering
- 44) Other Construction
- 45) Central Government
- 46) Education
- 47) Health Authorities, Trusts and Hospitals
- 48) Local Government
- 49) Social Services
- 50) Other Public Sector
- 51) Advertising and Public Relations
- 52) Media
- 53) Publishing, Printing and Photographic Services
- 54) Telecommunications and Postal services
- 55) Other Communications
- 56) Other

24) What was your highest level when you finished your education? Please choose only one of the following:

- 1) Secondary education – graduated at ordinary or lower examination level

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- 2) Secondary education – graduated at advanced or higher examination level
- 3) Uncompleted further education College or University
- 4) Graduate of any further education college or University
- 5) Masters
- 6) Doctorate
- 7) Post doctorate
- 8) Other

Thank you very much for completing this for us, it will be of real value to us in completing our work successfully.

RESUMEN DE LA TESIS

1. JUSTIFICACIÓN Y OBJETIVOS DE LA INVESTIGACIÓN

Aparece un ejemplo de los riesgos financieros en las transacciones electrónicas. Dado que las compras en línea ha ganado una creciente popularidad en todo el mundo, se ha convertido en mucho más posible robar información de las tarjetas de crédito durante una transacción en línea. Hay varias soluciones propuestas para este problema. Sin embargo, no hay ninguna solución concreta que utiliza la identidad de los clientes, sino que algunas contraseñas que son fáciles de olvidar o ser robado de un cliente. Por lo tanto, se necesita un método basado en la prueba de la propia identidad durante la transacción en línea. Esto podría ser posible mediante la autenticación biométrica, pero como no es barato que es, se necesita un sistema de identificación biométrico completo y listo para usar para tal intento. Esto da la bienvenida biométrica tarjeta de identificación electrónica que se está utilizando actualmente en muchos países para la autenticación electrónica. El uso de la tarjeta de identificación electrónica biométrica ofrece varias

mejoras en la velocidad de servicio y la prevención de robo de identidad y fraude posibilidades. De acuerdo con la definición de la UE, la identificación electrónica es el proceso de determinar de forma inequívoca la identidad de una persona / la entidad mediante el uso de medios electrónicos.

Recientemente en España una nueva tarjeta, un documento de avanzada con las medidas de seguridad altas que impidan el robo de identidad y servir como documento de viaje electrónica, así como ser capaz de comunicarse con los teléfonos inteligentes se ha introducido. El nuevo DNI cuenta con un microchip rápido, con mayor capacidad y certificado para crear una firma electrónica, siempre con el mismo valor que una firma en un papel. Se cree que la plataforma en línea para el DNI 3.0 creará diferentes aplicaciones móviles para gestionar servicios. (Euroweekly News, 2015)

En Europa muchos Estados miembros ofrecen a sus ciudadanos con DNI electrónico a través de tarjetas inteligentes, teléfonos móviles, u otras tecnologías: algunos Estados miembros combinan un eID con la

función de un documento de identidad utilizado también como documento de viaje, otros tienen una tarjeta de ciudadano a acceso a los servicios públicos en línea, otros trabajan con dispositivos móviles, o una combinación de la tarjeta y el teléfono. (Comunicado de prensa Europea, 2012) Las ventajas ofrece el sistema de identificación electrónica podrían hacer posible la introducción de verificación de identidad para las transacciones con tarjeta de crédito en línea. Proporcionar una breve inspección de los sistemas de compras en línea tradicionales y el sistema de identificación electrónica, este estudio se centra en el proyecto piloto de eID y describe la integración de la tarjeta de identificación electrónica a los sistemas de comercio electrónico basado en tarjetas de crédito. La última década del siglo 20 fue testigo de profundos cambios tecnológicos, entre los cuales es la llegada del comercio electrónico, o el intercambio de productos y servicios y los pagos a través de sistemas de telecomunicaciones (Kalakota y Whinston, 1997). Además de sus ventajas, vinieron sus contras, así como la suelta de control sobre la identidad, los riesgos de que fue robado. De este

modo se crea una resistencia a las nuevas tecnologías y de percibir de manera diferente.

Los sistemas nacionales de identidad electrónica ofrecen una variedad de beneficios para los individuos, las empresas y los gobiernos. Estos sistemas pueden ayudar a reducir el robo de identidad y permiten a las personas usar aplicaciones en línea más segura en una variedad de industrias, tales como la atención sanitaria y la banca. Las personas pueden utilizar un eID para autenticar a los servicios en línea, de forma segura comunicarse en línea, la compra de bienes y servicios, y crear la firma electrónica legalmente vinculante, como para firmar un contrato. Las empresas pueden utilizar las funciones de gestión de identidad para interactuar mejor con sus clientes a través de Internet, tales como para autenticar usuarios a aplicaciones en línea o para verificar las edades de sus clientes. Por último, el gobierno puede utilizar eIDs para agilizar los servicios de gobierno electrónico, permitirá a las personas a firmar y enviar formularios en línea, y ofrecer servicios innovadores.

A partir de la literatura Servicio de Innovación, servicio de negocios de alto nivel se interpreta como una de las cuatro dimensiones de innovación de servicios identificados por Den Hertog: El concepto de servicio (Den Hertog, 2000). El concepto de servicio se refiere a una "nueva propuesta de valor" en un mercado en particular. En él se describe que las necesidades del cliente son para estar satisfechos y cómo se logra esto. Se da una explicación detallada de lo que el servicio está destinado a proporcionar a los clientes y cómo la oferta de servicios está diseñado para hacerlo. (Den Hertog, 2000)

De acuerdo con esta definición, el concepto de servicio para los SP se puede definir por la siguiente propuesta de valor: la identificación electrónica como servicio permite externalizar la identificación y autenticación para aceptar las credenciales de identidad federada de acuerdo con un nivel requerido de aseguramiento. Esto permite SPs de beneficiarse de uno o más de los siguientes beneficios:

Lograr economías de producción: La identidad federada permite reutilizar procesos para pruebas de identidad y credenciales existentes (que ofrecen otros proveedores de servicios). Esto da lugar a economías de escala: reducción de los costos de administración y costos de proporcionar credenciales.

Mejorar el proceso de entrega del cliente: La identidad federada elimina la necesidad de que los clientes pasen por el mismo proceso de la identidad de pruebas para diferentes servicios y les permite volver a utilizar las credenciales que ya han adquirido para acceder a sus servicios. Esto se traduce en una mejora de 'amabilidad al cliente'.

Centrarse en la mejora y áreas de competencia principales: gestión de la identidad es complejo y requiere mucho tiempo; sin embargo, es una necesidad para permitir que sus servicios. Federated Identity ofrece la ventaja de que usted pueda centrarse en sus áreas de competencia, mientras que la externalización de sus actividades de gestión de identidad. El análisis de las relaciones entre el

modelo de aceptación de tecnología, la confianza y el uso del correo-id que se analizan en este estudio reúne las perspectivas teóricas de diversas disciplinas. En concreto, se incluyen las contribuciones de los dos campos de estudio: la confianza de marketing electrónico y tecnología de la información en la literatura de marketing.

a) La confianza en e-marketing

De acuerdo con los puntos de vista de confianza en línea, la confianza no es sólo un problema a corto plazo, sino también el signo fi barrera más significativa a largo plazo para la realización de los potenciales de comercio electrónico B2C (Gefen, 2000). La confianza es también un fi cativo no puede antecedente de la disposición de los clientes a participar en una transacción con los comerciantes web (Jarvenpaa et al., 2000) La confianza ha sido considerado como un catalizador en muchas de las transacciones entre compradores y vendedores que pueden ofrecer a los consumidores con altas expectativas de una relación de intercambio satisfactorio - buques (Hawes et al., 1989). Muchos

investigadores han argumentado que la confianza es esencial para entender el comportamiento interpersonal y los intercambios económicos (Luhmann, 1988; McKnight y Chervany, 2002) ventaja competitiva de .com. Teniendo en cuenta esos, se supone que la confianza en línea juega un papel importante en el uso y sostener de eID.

b) Aceptación de Tecnología en Marketing

De los diversos enfoques para efectos de la tecnología de la información en la comercialización, el interés de esta investigación se centra en la tecnología Modelo de Aceptación. (Davis, 1989) Como consecuencia de ello, esta investigación incluye las contribuciones de la literatura TAM relativas a la conceptualización y puesta en marcha de estrategias de TI, así como los que proponen los vínculos causales entre TAM y sus resultados. La elección de la elección de este modelo en el estudio reciente fue debido a su gran uso en el campo. Hay 519 investigaciones tituladas con Tecnología Modelo de Aceptación, mientras que 9.601 investigaciones han sido realizadas entre 1977 y

2015 años. Además, 912 de estas investigaciones se en el campo de la comercialización. Por lo tanto, el modelo es sutil con el presente estudio.

1.1. ESTRUCTURA DE LA TESIS

Esta tesis se ha diseñado en dos secciones. La primera sección incluye el desarrollo teórico y ofrece una revisión de la literatura del concepto relacionado que se mencionan en la investigación. Desarrollo teórico permite formular los vínculos entre la investigación modelo e-confianza, el uso de eID y otras variables que llevan a formular las hipótesis. La segunda sección está dedicada al desarrollo empírico. En esta parte, se introdujo la metodología a aplicar continuada por los resultados y las limitaciones del estudio.

Las dos secciones principales se subdividen en ocho capítulos: los primeros cuatro capítulos incluyen la sección teórica, los dos capítulos siguientes incluyen la investigación empírica y, por último, el capítulo

siete y ocho incluye los debates y las limitaciones de la investigación.

2. CONCLUSIONES OBTENIDAS Y FUTURAS LÍNEAS DE INVESTIGACIÓN

En general, todas las partes de esta tesis se documentan y coordinado con éxito. Introducción parte explica fondo de investigación, justificación, objetivos de la investigación, y el alcance de la tesis y también la importancia de la misma. Sección Teórica discutir acerca de los enfoques más en la realización de revisión de la literatura y las documentó en consecuencia. En esta parte se introducen el modelo conceptual y las hipótesis. Sección empírico que se analiza los resultados de la investigación y el diseño del sistema, mientras que la implementación y pruebas.

El objetivo general de esta tesis es analizar las razones para no utilizar de manera más eficiente la identificación electrónica y proponer un modelo conceptual basado en el modelo de aceptación de

tecnología. Para lograr esto, un estudio empírico sobre una muestra de 3.359 ciudadanos de la UE se llevó a cabo. En concreto, se centró en las personas que tenían acceso a la identificación electrónica en su país, lo que llevó a 1.156 personas en la muestra. La revisión de la literatura en esta investigación y la aplicación de modelos de SEM de los datos llevan a varias conclusiones que serán explicados en este capítulo. La necesidad de información, roles sociales y las características y el entorno exterior afecta a las decisiones de los consumidores. Hay barreras sociales, ambientales y personales que impiden o dificultan el paso de la información que tiene que ser recibido. En la comercialización sin fines de lucro, la complejidad de la información y el enriquecimiento de canales como medios de comunicación y las redes sociales hacen que sea más difícil para una persona a decidir si apoyar la causa (o no). En resumen, TAM, afirma que la intención de conducta es el factor principal que determina la aceptación o negativa a utilizar tecnologías de la información de un individuo. En otras palabras, es el factor principal que determina el uso real y que la intención de comportamiento de un individuo tiene un papel significativo en su / sus tendencias hacia el uso de

estas tecnologías. TAM establece que la percepción de una persona hacia la utilidad de utilización y facilidad de uso de las tecnologías de información y comunicación tienen efectos importantes en la formación de tendencias el / la del individuo para utilizar las tecnologías de información y comunicación. La intención de una persona de su uso está indirectamente afectada por la percepción de utilidad y facilidad de uso y estos efectos indirectos se producen a través de factor de tendencia del individuo hacia el uso.

En primer lugar, el concepto de modelo de aceptación de la tecnología se ha revisado con el fin de tener una comprensión científica de la resistencia de la gente a aceptar las nuevas tecnologías. Este modelo se ha utilizado mucho en muchos campo de los estudios sin embargo no ha habido ninguna relacionada con la identificación electrónica.

En segundo lugar, en esta investigación se han añadido las características de la confianza y conceptos relacionados, como la percepción de

riesgo, la seguridad y la privacidad como razones adversas al uso de la identificación electrónica. Explícitamente, la investigación se centralizó en dos cuestiones principales: a) ¿cuáles son las razones que interrumpen el uso de la identificación electrónica en una gama más amplia? b) Cómo sostener su uso en largo plazo? Las respuestas a estas preguntas pueden ayudar a avanzar en el proyecto STORK 2.0 en el futuro.

A pesar de la conceptualización general del modelo general, varias pruebas confirmaron su validez de constructo y, en consecuencia, la correspondencia entre los indicadores y la construcción teórica a medir. A pesar de las conclusiones acerca de los vínculos entre la aceptación de la tecnología, la confianza y el comportamiento real de esta investigación presenta ciertas limitaciones con respecto a las cuestiones teóricas, así como a las cuestiones metodológicas.

En primer lugar, si bien se utiliza la conceptualización de TAM a fin de mantener el uso de la identificación electrónica, una interesante línea de investigación

podría ser la integración de una perspectiva diferente en el modelo. Las investigaciones futuras deberían considerar el papel percibido facilidad de uso y utilidad percibida juntos como combinación con el fin de explicar la intención de utilizar de eID.

Otras limitaciones del estudio se refieren a la metodología empleada en la investigación empírica. En cuanto a la recogida de datos, la opinión de la muestra puede mejor conceptualizado con más puntos en el cuestionario, por ejemplo, en el caso de la facilidad de uso percibida. El tiempo dedicado a esta tesis fue inicialmente 2 años, que resultó todo un reto al final de investigador. Un período de tiempo más largo podría enriquecer el estudio con más concreción.

Otra limitación de este estudio se refiere a los análisis de validez convergente y discriminante de las escalas de medición. Mientras validez convergente y discriminante crea resultados, el modelo era bastante grande con el fin de obtener resultados. Las investigaciones futuras deberían dividir el modelo en las escalas para obtener resultados concretos.

Además, la base de datos no dan suficiente información para concluir el efecto moderador de la cultura se muestra como en el modelo estructural. En el futuro línea de investigación, las dimensiones de Hofstede pueden ser considerados como un efecto moderador para entender las diferencias de comportamiento culturales con el uso de la identificación electrónica.

La falta de estudios de investigación anteriores sobre la identificación electrónica fue otra limitación del estudio. Aunque los resultados de los proyectos STORK están disponibles públicamente, no ha habido ninguna investigación en la línea de identificación electrónica. Para futuras investigaciones, esta tesis espero que sirva de referencia.

La identificación electrónica es una innovación. Por lo tanto, las nuevas tecnologías, como smartwatches o cualquier aplicación que requiera una identificación segura se beneficiarán de la

comprensión de los factores que son objeto de esta tesis.