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EFFECT OF ENJOYMENT
ON ATTITUDE AND ON BEHAVIORAL INTENTION
TO USE MOBILE APPLICATIONS
WHEN TECHNOLOGY USE IS MANDATORY

TIIVISTELMÄ

Tässä tutkimuksessa tutkittiin kolmen tekijän, käyttöaikeen, nautinnollisuuden ja asenteen vaikutusta teknologian hyväksynnässä, kun teknologian käyttäminen on pakollista. Tutkimus koostui sekä kirjallisuuskatsauksesta että kokeellisesta tutkimuksesta, jotta löydettäisiin vastaukset seuraaviin kahteen tutkimuskysymykseen: "Onko asenne luotettava teknologian käyttöaikeen ennustaja silloin, kun teknologian käyttäminen on pakollista?" ja "Onko nautinnollisuus asennetta ja teknologian käyttöaietta ennustava tekijä silloin, kun teknologian käyttäminen on pakollista?" Suoritetussa kirjallisuuskatsauksessa perehdyttiin aiempiin tutkimuksiin. Sen jälkeen tehtiin kokeellinen tutkimus, johon osallistui 267 kenttätyötä tekevää poliisia Suomessa. Kerätyn aineiston perusteella tehtiin rakenneyhtälömallinnuksen avulla analyysi, jossa käytettiin kehitettyä mittausmallia. Malli sisälsi nuo kyseiset kolme tekijää; käyttöaikeen, nautinnollisuuden ja asenteen. Tulosten perusteella näyttää siltä, että molempiin tutkimuskysymyksiin voidaan vastata myönteisesti. Tutkimustulokset osoittivat, että nautinnollisuus on asenteen ja teknologian käyttöaikeen merkittävä määrittävä tekijä myös sellaisten tietojärjestelmien yhteydessä, joiden käyttäminen on pakollista, eikä vain hupikäyttöön tarkoitettujen järjestelmien yhteydessä. Lisäksi tulosten perusteella näyttäisi siltä, että asenne on luotettava käyttöaietta määrittävä tekijä teknologian pakollisen käytön yhteydessä. Yhteenvetona voidaan esittää, että tutkimustulokset vahvistavat tietojärjestelmien nykytutkimuksen tuloksia siinä, että nautinnollisuus ja asenne ovat myös teknologian pakollisessa käytössä merkittäviä tekijöitä.

Avainsanat: teknologian hyväksyntä, pakollinen käyttö, nautinnollisuus, käyttöaie, asenne, rakenneyhtälömallinnus

ABSTRACT

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The current study studied the effects of three latent factors in technology acceptance in mandatory context; behavioral intention, perceived enjoyment and attitude. The study contained both literature review and empirical research to find answers to two research questions: "Is attitude a reliable predictor of behavioral intention to use technology when the use is mandatory?", and "Is enjoyment an antecedent of attitude and behavioral intention to use technology when the use is mandatory?". The literature review was made to review previous research results. After that the empirical study was performed with subjects of 267 police officers working in field operations in Finland. Based on data collected in survey, a structural equation modelling (SEM) analysis was performed with latent constructs using the measurement model developed in the beginning of the study. Model contained those three latent factors, behavioral intention, perceived enjoyment and attitude. The results suggested that both research questions can be answered in the affirmative. Research results indicated that enjoyment is important factor and significant antecedent of attitude and behavioral intention also in the context of utilitarian, mandatory information systems, not only that of hedonic systems. Moreover, results suggested that attitude is a reliable antecedent of behavioral intention in mandatory context. In a summary, the current study supports the newest suggestions in information systems research that attitude towards using the information system and perceived enjoyment are important factors in technology acceptance in mandatory setting as well.

Keywords: technology acceptance, mandatory use, perceived enjoyment, behavioral intention, attitude, SEM

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1 INTRODUCTION

1.1 Background and Relevance of the Research

The technology acceptance as a research area in the field of information systems (IS) has been popular in the past twenty years. It has produced a great amount of new information about how people as technology adaptors and users behave when new technology is introduced to them. New theories and models have been developed based on the results. Several factors have been found to be significant for the human's behavioral intention to adopt new technology. Such factors, as usefulness, ease of use, subjective norm, attitude, job relevance, facilitating conditions, enjoyment, and individual characteristics have been confirmed to be relevant and important in the process of adopting new technology (Li, 2010). These factors have been proved to be reliable antecedents of intention to use technology in several contexts. Today, the current mainstream assumption is that the utilitarian systems are accepted through extrinsic motivation factors like usefulness, ease of use, subjective norm, job relevance, and facilitating conditions, and hedonic systems through intrinsic motivation factors like enjoyment, attitude, and personal values (Gerow, Ayyagari, Thatcher, & Roth, 2013). However, Gerow et al (2013) suggest that intrinsic motivation factors play equally important role both in hedonic and utilitarian contexts. Today, new technology with its fascinating applications is becoming a worthy option in utilitarian and mandatory information system contexts as well. Good example is BYOD (bring your own device), today's popular tendency to use personal information systems, like tablets and smart phones, in work environment. This may be a sign of the growing role of intrinsic factors affecting new technology adoption also in utilitarian, maybe in the mandatory context as well. This trend, in turn, may highlight the role of enjoyment and attitude as factors affecting to user's intention to adopt new technology in the mandatory context. The current study concentrates on that specific area in aiming to study the roles of attitude and enjoyment, representing intrinsic motivation factors, on behavioral intention to use new technology when use is mandatory. The current study is based

on data collected in the research work described in Kurkinen (2012). That specific research concentrated on technology acceptance in mandatory setting, more specifically in the context of law enforcement organization, the Finnish Police Force. It studied the effects of compatibility and team member on TAM constructs which are traditional and reliable measures of technology acceptance. The current study examines the field of technology acceptance in mandatory context from a different point of view. The aim is to look for new factors affecting on intention to use new technology by adding intrinsic values, attitude and enjoyment, to operate as new and novel determinants of intention to use new technology in mandatory setting.

1.2   Different Contexts of Technology Use

The contexts where technology is used can be classified, among other things, according to the users' possibilities to make choices between different technologies. If there is a total freedom for the user to make one's decision whether to use or not to use a certain technology, the use can be classified to be *volitional*. Good example of this type of usage is a normal usage of consumer products when a common user can make his or her own decision what product he or she prefers and make a purchase decision accordingly. If the user has no possibility to make a selection between different choices the use can be classified to be *mandatory* (Chesney, 2008). Examples of mandatory usage are utilization of enterprise information systems and systems of public authorities, law enforcement, military, etc. Those are classified also to be *utilitarian* as they are used for some external reason, like to accomplish their responsibilities at work, perform better in the duties, or to have some important work related activity done (Ibid.). From technology point of view from users' perspective those systems are mandatory as the corporation or organization makes the selection of the technology to be used, not by the users themselves. Users have no other option than to use the given technology. In this type of use the investments on the new technology, like mobile information systems for public organizations, are typically extremely high and in public organizations are financed with public financing. This sets the investments on information systems under critical scrutiny. Therefore, technology acceptance in mandatory setting is a growing area in the information systems research area (Hu, Chen, Hu, Larson, & Butierez, 2011). This study concentrates on this mandatory setting.

1.3   Perceived Enjoyment, Behavioral Intention and Attitude when Technology Use Is Mandatory

Even though technology acceptance as such as a research area in the information system research domain has been popular, the impact of intrinsic factors,

like perceived enjoyment, on users' intention to use new technology in the context where the use is mandatory has not been a mainstream research theme. In the context of voluntary use, like consumer context, it has, and still is a very popular research area in technology acceptance. Hence, enjoyment is not believed to be linked with mandatory technology use but with voluntary hedonic use of technology instead (Teo & Noyes, 2011; Wakefield & Whitten, 2006). However, there are studies suggesting that hedonic values, like enjoyment, may play a pivotal role in new technology acceptance in mandatory settings as well (Gerow et al., 2013; Luo, Gurung, & Shim, 2010; van der Heijden, 2004). This dissident outlook may offer new research opportunities in the area of technology acceptance. These opportunities include the effect of enjoyment on attitude and on behavioral intention which is the main theme of the current research.

Behavioral intention is a construct referring to a person's intention to perform certain behavior (Fishbein & Ajzen, 1975). According to Ajzen and Fisbein, being a belief, behavioral intention can be indicated by the subjective probability of a person to perform that behavior. By definition, the construct of behavioral intention links the person to his or her behavior. In the context of technology acceptance, the behavioral intention to use a certain technology has been shown to be the strongest determinant for the actual use of that technology (Davis, 1989; Venkatesh, 2000; Venkatesh & Bala, 2008). According to the Theory of Reasoned Action (TRA), a person's action is a function of behavioral intention of the person in question (Fishbein & Ajzen, 1975). Moreover, a great amount of studies have shown the predictive character of behavior so that it should be possible to predict certain behaviors based on intentions with acceptable accuracy (Aizen, 2005). Thus, behavioral intention to use an information system is expected to lead to actual usage of it. In shaping this expected behavioral intention, attitude formation, the context, and the expected outcome arising from the action might play a pivotal role.

Perceived enjoyment can be defined (Davis, Bagozzi, & Warshaw, 1992) as

> "the extent to which the activity of using the computer is perceived to be enjoyable in it's own right, apart from any performance consequences that may be anticipated".

Davis et al. (1992) suggested in their article that enjoyment was, albeit being a secondary factor, a significant determinant of behavioral intention to use computers in workplace. Especially, they showed that enjoyment combined with usefulness is a powerful explanation of the user's behavioral intentions. Moreover, it has been proposed that perceived enjoyment is the most dominant determinant of usefulness, ease of use and attitude in mandatory setting (Teo & Noyes, 2011).

Attitude is a complicated and argued construct in social sciences and is commonly described (Fishbein & Ajzen, 1975) as

> "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object".

According to this definition attitude has three basic features. Firstly, it is learned, secondly it predisposes action and thirdly, those actions are consistently favorable or unfavorable toward the object. Additional research results suggest that attitude has a strong, direct and positive effect on intentions and has been supported in various research settings (Ajzen & Fishbein, 2005; Dabholkar & Bagozzi, 2002). This existence of the effect of attitude on behavior is based on the proposal of Ajzen and Fisbein, who proposed that there are two kinds of attitude (Ajzen & Fishbein, 2005). The first type includes general attitudes towards some physical objects, ethnic or racial groups, institutions, policies, or general targets. The second type, which is then related to the behavior, includes attitudes toward performing a specific behavior which is related to a specific target or physical object. These types of attitudes are referred as *attitudes toward a behavior* and are used generally also in the context of technology acceptance research.

1.4 Research Problem Statement

This study concentrates on the effects of enjoyment, and attitude on behavioral intention to use new technology when use is mandatory. The aim of this study is firstly, to review the relevant literature of the key concepts on how the effect of enjoyment on attitude and on behavioral intention of the user in the mandatory setting has been researched earlier. Secondly, aim is to carry out an empirical research with real subjects in mandatory context to find if the hypotheses hold or not.

The research literature on enjoyment, attitude and behavioral intention also seen through the lens of technology acceptance is broad and versatile. However, based on presentiment, most of the literature would not exactly be in the scope of this research. Enjoyment, attitude and behavioral intention have been studied in the connection of technology acceptance from several standpoints. All these three factors are internal, intrinsic and hedonic factors from user's point of view. Based on presentiment, hedonic internal factors have not been studied ectensively in the context of this study. However, with the growing interest toward these factors, it seems that hedonic internal factors may have an important addition to technology acceptance models also in utilitarian context, especially when the use is mandatory.

These research problems are formulated into research questions in the following chapter.

1.5 Research Questions

The research problems are addressed using the following research questions:

1. Is attitude a reliable predictor of behavioral intention to use technology when the use is mandatory?
2. Is enjoyment an antecedent of attitude and behavioral intention to use technology when the use is mandatory?

1.6 Purpose of the Research

The main purpose of the current research is to find support for the postulate that enjoyment, not only in the context of volitional information system use, but also in mandatory context, is a noteworthy antecedent of user's intention to use technology. Target users in the research context, in mandatory setting, are Finnish police officers, who are planned to use new mobile technology in their field operations in the future (Sisäasiainministeriö, 2011).

The study can be understood to be comprised of four parts; theory development, literature review, empirical part and conclusions. The theory development part consists of the development of the theory, hypothesis and the measurement model for the study, literature review part consists of the review of the relevant literature to find possible support for the hypotheses and finally, empirical part contains the research and results of the survey with real subjects, and finally conclusions part contains the discussion and conclusions.

1.7 Research Process

In order to make the current study, a research process depicted in FIGURE 1 was used.
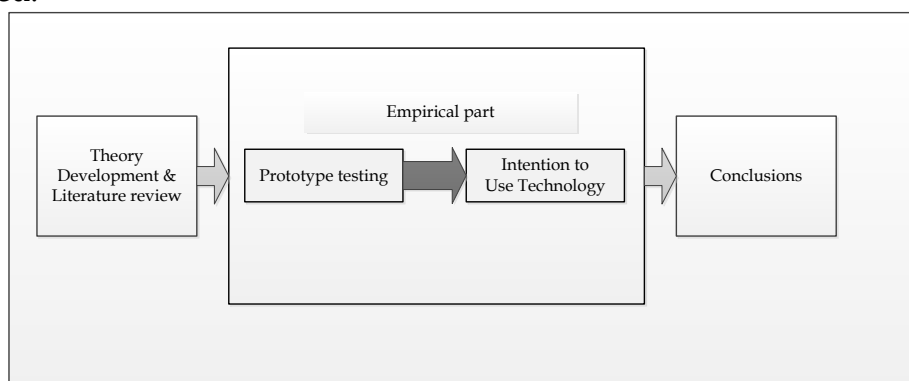
FIGURE 1 Research process

The process, especially its empirical part, is applied from prior study (Kurkinen, 2012). In the process there are three main components; theory development and

literature review, empirical part and conclusions. The division of the study is following the structure of the process as well. In the theory development and literature review part the research questions, theory, hypotheses and research model are built, and relevant literature is reviewed. In the empirical part the hypotheses are tested using test subject to validate the measurement model, confirm or nullify the hypotheses. The conclusions part contains the discussion of the research results and conclusions, limitations and contributions of the research.

The empirical part is based on the idea of using pre-prototype testing in measuring and predicting user intentions to use IT system (Davis, 2004). The use of pre-prototype testing in predicting the user acceptance in IT systems in the framework is based on his findings. During the measurement, a pre-prototype of a police mobile IT system is presented in the video presentation and immediately after that enjoyment, attitude, and behavioral intention are measured using test subjects. The same empirical setting was used in Kurkinen (2012).

1.8   Theoretical Foundations

As stated earlier, the impact of perceived enjoyment on the users' intentions to use new technology in the context where the use is mandatory has not been a mainstream research theme. Just opposite, in the context of voluntary use, like consumer context, it has, and still is a very popular research area in technology acceptance. Hence, until now enjoyment has not been believed to be connected to mandatory technology use but with voluntary hedonic use of technology instead (Teo & Noyes, 2011; Wakefield & Whitten, 2006). Recently new studies are suggesting that hedonic values, like enjoyment, are having an worthy role in new technology acceptance also in mandatory settings as well (Gerow et al., 2013; Luo et al., 2010; van der Heijden, 2004). The form of thinking in the academy offers new research opportunities in the area of technology acceptance, including the effect of enjoyment on attitude and on behavioral intention. This is the scope of the current research.

1.9   Structure of the Study

The current study is organized as follows: Chapter 1 includes the introduction to the theme and to the central constructs of the research, followed by the research problem statement, and by the introduction of research questions. Then the purpose of the research and research framework are introduced followed by the introductions of theoretical foundations and the research model. Chapter 2 is comprised of the relevant literature review. Chapter 3 includes the empirical study including the introduction of the target group of the study. Chapter 4

presents the results of the empirical part of the study. Chapter 5 includes the discussion, answers to the research questions and conclusions. The study is concluded by the summary.

2   LITERATURE REVIEW

In this chapter the literature review is introduced. The literature for behavioral intention is searched and reviewed, followed by introduction of the literature for attitude and enjoyment. Chapter continues with the literature review for effects of attitude on behavioral intention and with the review for effects of enjoyment on attitude and behavioral intention followed by discussion of the findings. Summary concludes this chapter.

2.1   Goal of the Literature Review

The goal of this literature review is to review the key constructs especially regarding the mandatory use of technology. All above-mentioned three factors, perceived enjoyment, attitude and behavioral intention are intrinsic, internal to the user of the information system. Such factors as usefulness and ease of use are extrinsic, external to the user. This division of factors was a guideline for the current literature review to be presented in this chapter. Emphasis was on the use of technology in utilitarian use where the user mainly uses technology because of external factors like work or profession related reasons.

The literature in technology acceptance area has been recently thoroughly reviewed (Gerow et al., 2013). The results of a meta-analysis of 172 technology acceptance research papers showed that the classical division of the factors in technology acceptance does not necessarily hold. Current trend has been and still is that external factors are important to utilitarian systems and internal, intrinsic factors are more important for hedonic systems. Gerow et al. (2013) suggested based on their findings that intrinsic motivation of users is important for all types of systems. This is contradicting with the current unchallenged assumption that the utilitarian systems are accepted through extrinsic motivation and hedonic systems through intrinsic motivation. These findings motivated to find relevant literature on the intrinsic motivation factors in the mandatory context for this review.

The systematic literature review (SLR) on IS research area can be based for example on the concepts discussed by Webster and Watson (Webster & Watson, 2002), Ocoli and Schabram (Okoli & Schabram, 2010) , and Levy and Ellis (Levy & Ellis, 2006). According to these processes, there are three phases in SLR. The process starts with identifying first the articles form leading journals and conferences in the research area. In IS research areas should be taken also outside the IS domain because IS research is a young science compared to many others. In the second phase (backward search), the citations on articles found in the first phase in order to find all prior articles which are relevant for the review. In the third phase (forward search) all articles citing the articles found in previous steps should be identified for the final review.

In the current study the literature review process was a modified version of the process above. It started with identifying key journals and the articles using the words "enjoyment", "attitude", "technology acceptance", "mandatory use" and "utilitarian use" as keywords for the search machines. The search engines which were used were:

IEEE Xplore - IEEE/IEE Electronic Library
ACM Digital Library
SCOPUS (Elsevier)
Web of Science
Google Scholar
Computer and Information Systems Abstracts (ProQuest)
Electronics and Communications Abstracts (ProQuest)
ProQuest Central (ProQuest)
Academic Search Elite (EBSCO)

The search produced articles exceeding the amount of 200. Only part of those articles was reports on studies done in the utilitarian context, and only small friction in mandatory context. The search continued by limiting the search to mandatory context by using key words "mandatory", "enjoyment", "attitude". Finally in the end, totally 25 articles were selected in to this review. They are listed in TABLE 1 in the format modified from Gerow at al.(2012). The table presents the author, interested factors from the current study point of view and type of information system what the article is based on. The articles are discussed in the following sections.

TABLE 1 List of reviewed articles

author	interesting motivation factor	system type
Aizen (2005)	attitude, behavioral intention, enjoyment	N/A
Ajzen & Fishbein (2005)	attitude, behavioral intention	N/A
Bogardus (1920)	attitude	N/A
Breckler (1984)	attitude	mandatory
Brown et al.(2002)	attitude	mandatory
Dabholkar & Bagozzi (2002)	attitude	hedonic
Davis (1992)	attitude	utilitarian
Davis (1989)	attitude, enjoyment	utilitarian, mandatory
Davis, Bagozzi & Warshaw (1992)	enjoyment, attitude	utilitarian, mandatory
Dickinger, Arami & Meyer (2008)	enjoyment	utilitarian
Fishbein & Ajzen (1975)	attitude, enjoyment	N/A
Hong et al. (2011)	attitude	utilitarian
Igbaria, Iivari & Maragahh (1995)	enjoyment	utilitarian, mandatory
Igbaria, Parasuraman & Baroudi (1996)	enjoyment	utilitarian, mandatory
Lin & Bhattacherjee (2010)	enjoyment	hedonic
Luo et al. (2010)	enjoyment behavioral intention	utilitarian
Mathieson (1991)	attitude	utilitarian
Rawstorne, Jayasuriya & Caputi (2000)	attitude	mandatory
Taylor & Todd (1995)	attitude	utilitarian
Teo & Noyes (2011)	enjoyment	mandatory
van der Heijden (2004)	enjoyment	utilitarian
Venkatesh & Bala (2008)	behavioral intention	utilitarian
Venkatesh (2000)	behavioral intention, enjoyment	utilitarian
Venkatesh et al. (2003)	behavioral intention	utilitarian
Voss, Spangenberg & Grohmann (2003)	attitude	hedonic

2.2   Behavioral Intention

Why behavioral intention (BI) is a key construct in technology acceptance research? According to Fishbein and Ajzen, behavioral intention is a latent construct referring to a person's intention to perform certain behavior (Fishbein & Ajzen, 1975). Further, they propose that being a belief, behavioral intention can be indicated by the subjective probability of a person to perform that behavior. By definition, the construct of behavioral intention links the person to behavior. In the context of technology acceptance, the behavioral intention to use a certain technology has been shown to be the strongest determinant for the actual use of that technology (Davis, 1989; Venkatesh, 2000; Venkatesh & Bala, 2008). Moreover, a great deal of research result has demonstrated the predictive character of behavior so that it should be possible to predict certain behaviors based on intentions with acceptable accuracy (Aizen, 2005). Thus, behavioral intention to use an information system is expected to lead to actual usage of it.

Most of the research work described above has been done in circumstances where the user has full control over his or her behavior. In that case the user possesses volitional control, meaning that the user has the ability to use one's own free will. The concept of volitional control applies to an individual's mental capacity to act freely and that he or she understands all the consequences. For example, a person with a mental illness may lack volitional control. Volitional control is supposed to moderate the linkage between intention and behavior so that when the volitional control is high the effect is stronger compared to the situation when the volitional control low (Aizen, 2005). In the context of the current study, information system use under mandatory circumstances, when the user has no free choice over his or her information system selection, the situation may be different. The perceived volitional control should logically be low. Hence, one may assume that in those cases when the volitional control is low the effect of behavioral intention to real use is low as well. This may be understood that mandated information system use, like mandatory use of technology by professional users, is a type of non-volitional behavior. However, it is a different type of non-volitional control than that discussed by Ajzen describing the list of the internal and external factors that influence volitional control (Ajzen, 1985). It has been proposed (Rawstorne, Jayasuriya, & Caputi, 2000) that the major difference between Ajzen's (1985) volitional control and the volitional control associated with mandatory behavior would be that the absence of volitional control would prevent a person's will *to perform the behavior*, whereas mandatory use of technology prevents a person's will *not to perform the behavior*.

The background for all these concepts was laid in the Theory of Reasoned Actions (TRA) (Fishbein & Ajzen, 1975). According to TRA, humans make rational choices and make use of the information which is available to make their decisions. People weigh up the consequences caused by their actions when performing a behavior. The model of TRA is depicted in FIGURE 2 .
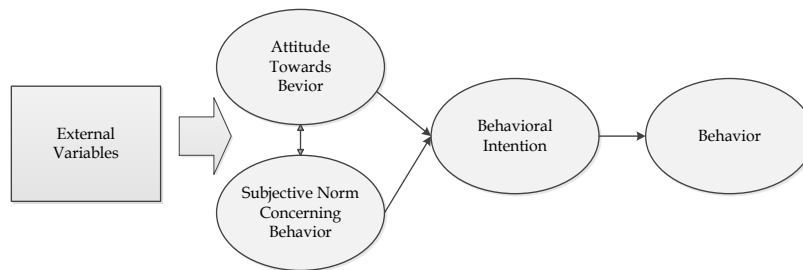
FIGURE 2 Theory of Reasoned Action (TRA) from Fishbein & Ajzen (1975)

TRA was later tuned for situations where there is low or no volitional control at all by introducing the concept of theory of planned behavior (TBP) by adding a new variable into the TRA model. the new variable is called perceived behavioral control (PBC) (Ajzen, 1985). Perceived behavioral control measures a human's perception of control when performing a behavior in question. In the IS research PBC has been defined (Taylor & Todd, 1995 p. 149) as

"perceptions of internal and external constraints on behavior"

PBC was introduced to predict and explain both intention and behavior in cases where there was no volitional control over the behavior. These cases include among other things the use of information systems in organizations and enterprises. PBC, is, by definition, a measure of the extent to which the individual feels control over *performing* the behavior, rather than *not performing* the behavior. These issues have raised questions of the usefulness of the TPB for explaining and predicting mandated information system usage. However, there are classical studies which show the power of TPB in the context of mandatory information system use. In comparison study, TPB has been suggested to possess good predictability for individual's intentions to use information system (Mathieson, 1991). Similarly, it has been proposed that TPB is capable to provide more complete understanding of intention compared to some other models (Taylor & Todd, 1995).The model of Theory of Planned Behavior is depicted in FIGURE 3.
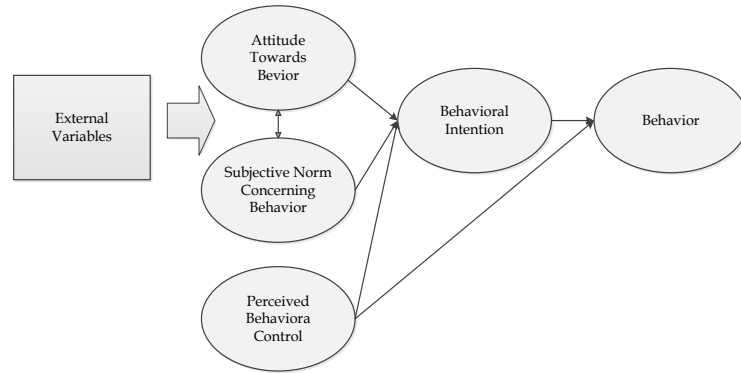
FIGURE 3 Theory of Planned Behavior (TPB) from Fishbein & Ajzen (1975)

Behavioral intention is a key construct in various models developed in the academy trying to explain the user behavior in technology acceptance. Technology acceptance model (TAM) (Davis, 1989) which has later been amended to TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008), and UTAUT (Venkatesh, Morris, Gordon B. Davis, & Davis, 2003) are good examples utilizing the behavioral intention concept. The model of TAM is depicted in FIGURE 4.
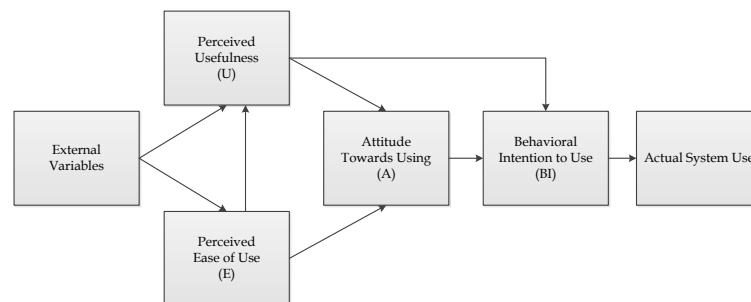
FIGURE 4 Technology Acceptance Model (TAM) from Davis (1989)

Moreover, hybrid theories combining several research theories and models into new ones, like decomposed theory of planned behavior (Taylor & Todd, 1995) includes behavioral intention as a key construct to predict actual behavior.

2.3   Attitude

Attitude in the modern psychology and human science literature today is believed to possess three major dimensions. Based on this tripartite model attitude comprises cognitive, affective (or emotional) and behavioral elements (Ajzen & Fishbein, 2005; Hong, Thong, Chasalow, & Dhillon, 2011). The cognitive dimension is understood to pertain to person's beliefs, thoughts and perceptual re-

sponses on the object of attitude in question. The affective or emotional dimension refers to person's feelings and emotional responses, or instinctive reactions about the same object. The behavioral dimension reflects individual's evaluations of attitude object based on his or her existing behaviors. This tripartite model has been validated in several empirical research settings and contexts (Breckler, 1984; Hong et al., 2011). It has been shown by them that this three component model possesses discriminant validity and has moderate and adequate correlation between the components. Before the tripartite model was introduced, attitude was believed to have only one dimensional, mainly affective type of component in terms of the modern thinking. It was believed to be a single, evaluative construct only which is used by a human when making evaluations of the objects. However, attitude defined in that form failed in explaining how attitude could *predict* the human behavior. For that reason several scientist suggested that attitude may have several dimensions which might better be used also in explaining the predictive disposition of attitude.

The background of the tripartite attitude model lies in the three facets of the human experience which go back to the early history of science. The trichotomy of feeling, acting and knowing can be traced to the ideas of the ancient Greek philosophers. That connection of trichotomy of human experience to the structure of attitude can be also seen in the earliest writings of the psychological research in the 1920's (e.g. Bogardus, 1920). Finally, in the late 1940's the tripartite model was formally acknowledged when all three aspects of attitude were explicated (Breckler, 1984).

However, it was soon discovered that not even this tripartite model of attitude could account for the attitude-behavior relationship clearly enough. This has been explained to be a consequence of inconsistencies regarding the respondents' intentions and actions. In other words, there is a mismatch between what people say they would do and what they really do. Moreover, the measurement scales to measure attitude at that time tended to be too detailed and narrow. Hence, they were not able to capture the relevant elements of attitude in the research domain in question. The consequence was that the connection between general attitudes and behavioral intentions could not be detected (Ajzen & Fishbein, 2005). To overcome these types of inconsistencies an aggregated model was proposed (Fishbein & Ajzen, 1974). In that aggregated model several instruments were used to capture the broad spectrum of attitude. On practical, measurement level it also meant that aggregation simply increased the reliability of the measurements.

How attitude can then be seen from the point of view of the current study, in the light of technology acceptance of utilitarian users whose use is mandatory? Recent studies shed light on this. It has been shown that attitude also can be viewed from this perspective. According to some later results attitude can be comprised of two distinct dimensions, hedonic and utilitarian component (Voss, Spangenberg, & Grohmann, 2003). Even though their results are from consumer context with full volitional control of the subjects, their findings help to understand the structure of attitude also in the mandatory context.

2.4 Enjoyment

In the context of technology acceptance in mandatory use intrinsic beliefs, like enjoyment, have not drawn a great attention in science. This is due to the popularity of external factors, like usefulness and ease of use which are been considered linked better to work related utilitarian use. Enjoyment is a hedonic oriented factor which, as defined by Davis (1992 p. 1113),

> "refers to the extent to which the activity of using the computer is perceived to be enjoyable in it's own right, apart from any performance consequences that may be anticipated".

As an intrinsic belief, it is derived from interactions between the user and technology. It is internal to the user. User may enjoy of the technology and interactions with technology as such. This can be seen today for example in the popularity of touch screens, animations, sound and tactile responses in tablets and mobile phones. For example popular and dominant technology acceptance model TAM is based on the power of external factors and is used also in work related studies. Hence, enjoyment as an intrinsic factor in utilitarian context, and especially in mandatory context has been studied fairly poorly compared to the studies in volatile contexts whether or not it could explain user's behavior.

Davis et al. proposed in their article (Davis et al., 1992) that enjoyment was, albeit being a secondary factor, a significant determinant of behavioral intention to use computers in workplace. Especially, they showed that enjoyment combined with usefulness is a powerful explanation of the user's behavioral intentions. They demonstrated that enjoyment has a greater positive effect on intentions to use computers when computers are perceived to be more useful. In other words, if computers lack perceived usefulness, enjoyment has a smaller effect on user acceptance and vice versa. Further, if the computer systems are enjoyable measured by their interaction effects, usefulness has a greater effect on intentions to use those computer systems. They conclude that increasing the enjoyability of computer systems would enhance the acceptability of useful systems but would have less effect on the acceptability of less useful computer systems (Ibid.).

Moreover, it has been proposed that perceived enjoyment is the most dominant determinant of usefulness, ease of use and attitude in mandatory setting (Teo & Noyes, 2011). In their study of 153 pre-service teachers Teo and Noyes showed that enjoyment has a significant effect on core constructs of TAM model. Enjoyment had the largest effect on perceived usefulness, then on perceived ease of use and on behavioral intention to use technology. This finding was on the contrary to the earlier results (Venkatesh, 2000) suggesting that enjoyment would be affecting on perceived usefulness mainly indirectly via perceived ease of use.

In the context of hedonic use, which is out of the scope of this study, enjoyment has been studied a lot and has been found to be one of the most im-

portant factors in explaining users' intentions to use technology (Lin & Bhattacherjee, 2010).

2.5 Effect of Attitude on Behavioral Intention

The connection between attitude and behavioral intention is essential in theory of reasoned actions (TRA) and in Theory of Planned Behavior (TPB) discussed above and which were depicted in FIGURE 2 and in FIGURE 3. Further, both TRA and TPB are fundamental base elements for several technology acceptance models developed afterwards, like in the original TAM model (Davis, 1989). How this connection has been then explained to be able to capture the required information of attitude to have effect on behavioral intention?

As already seen above, attitude is a complicated and argued construct in social sciences and is commonly described (Fishbein & Ajzen, 1975) as

> "a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object".

According to this definition it has three basic features; firstly it is learned, secondly it predisposes action, and thirdly, those actions are consistently favorable or unfavorable toward the object (Ibid). Additional research suggests that attitude has a strong, direct and positive effect on intentions and has been supported in very many settings (Ajzen & Fishbein, 2005; Dabholkar & Bagozzi, 2002). This existence of the effect of attitude on behavior is based on the proposal of Ajzen and Fisbein, who proposed that there are two kinds of attitude (Ajzen & Fishbein, 2005). The first type includes general attitudes towards some concrete physical objects, like different groups of people, governmental institutions, policies, or general targets. The second type, which is more related to the behavior, contains attitudes toward performing a specific behavior which is related to a specific target or physical object. These types of attitudes are referred as *attitudes toward a behavior*. These types of attitude are used generally also in the context of technology acceptance research. Based on these principles it should be possible to predict individual behaviors based on attitudes towards those behaviors. This expectation has been supported by several studies in human sciences having statistically significant correlations in the region of 0.70 between attitude and behavior (Ibid.).

Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) is an overall model for understanding people's behavior in general,

> "designed to explain virtually any human behavior".

It is commonly used in social psychology. It is also a very largely used theory in technology acceptance. According to TRA, behavioral intention is a main factor in predicting behavior of humans. Fishbein and Ajzen posit that humans

make rational choices and utilize the information which is available, for their decision making. In other words, people weigh up the consequences of their actions when carrying a certain behavior into effect (Ibid.).

Based on the constructs from TRA, Davis proposed his theory on the technology acceptance model (TAM) in the domain of information technology (Davis, 1989). TAM defines perceived usefulness and perceived ease of use as main determinants of intention to use technology. The main aim of TAM was to provide a ground for finding the impacts of external variables on internal beliefs, attitudes and intentions (Legris, 2003). The original TAM model also included attitude as a mediator of usefulness and ease of use as a mediator of the intention to use.

How Davis originally included attitude into his TAM but later discarded it? Davis (1989) derived the use of attitude in TAM by starting from TRA where a person's attitude toward a behavior is determined by his or her salient beliefs about all consequences of performing a behavior. Further, beliefs are, according to Davis, defined as the individual's subjective probability that performing the target behavior will lead to that very same consequence. An individual then processes these beliefs as external stimuli to his or her belief structure and by doing this is formatting his or her personal attitude. In this way Davis asserted that TRA, and later also TAM, with attitude in it, is suitable just for IS research as any factor influences only indirectly via attitude (and via subjective norm in TRA). In this way TRA is capable to capture user's internal psychological variables through which various external variables (which are studied mostly in IS research) achieve the influence on user acceptance. This is in line with the original aim of TAM trying to provide basis for tracing the impact of external factors on internal beliefs, attitudes and intentions (Davis, Bagozzi, & Warshaw, 1989). In TAM the attitude-behavioral intention relation implies that people form their intentions to perform certain behavior toward objects which they have positive affect. This can be understood also in the light of understanding the tripartite attitude structure. The affective dimension of attitude is related to this attitude-intention relationship and captures the affective part of a person's attitude toward behavioral intention.

The study for the original TAM development was performed among 120 employees of IBM, using their electronic mail system and general editor. These types of applications in the study indicate that the use could be understand to be mandatory. Following the study and after the investigations based on TRA and TAM had been completed, attitude was removed from the model, (Davis et al., 1989) as

"their confluence led to the identification of a more parsimonious causal structure that is powerful for predicting and explaining user behaviour based on only three theoretical constructs: behavioural intention (BI), perceived usefulness (U) and perceived ease of use (EOU)"

This later study of Davis et al. (1989) was done with 107 MBA-students using a word processing application which can be deemed as a mandatory use. It has

been demonstrated that the power of parsimonious TAM without attitude is equally good as with attitude (Venkatesh & Davis, 2000).

The fundamental link between attitude and behavioral intention has not survived by no means without criticism, especially in circumstances where the use is mandatory. Even though attitude as such has been suggested to be vitally important also in mandatory settings, but the power of attitude to predict behavioral intention has been questioned (Brown, Massey, Montoya-Weiss, & Burkman, 2002). Brown et al. in their study comparing original TAM, parsimonious TAM (without attitude) and TPB in mandatory context suggested that the effect of attitude on behavioral intention is insignificant. They explain this deviating finding by employees' feelings which do not influence their intention to use system because extrinsic motivation factors (such as they have been requested to do so) play equally important role. Employees use the system as long as they are hired in the organization to do their jobs independently of their intentions. However, they state that negative attitudes about technology may effect on the users' interpretations and linkages with new technology installations. They conclude their findings that attitude-behavior link in mandatory settings is more complex compared to that of volatile settings and more research is needed to provide a richer characterization of this link in mandatory environments.

2.6   Effect of Enjoyment on Attitude and on Behavioral Intention

In addition to the definition of enjoyment above, perceived enjoyment can be defined also as the excitement and happiness derived from information technology use (van der Heijden, 2004). Enjoyment has been demonstrated to influence user attitudes towards utilitarian systems as an intrinsic motivator, even when perceived usefulness is an extrinsic motivator (Davis et al., 1992). As normally expected, perceived enjoyment should have a stronger effect on user attitudes towards hedonic systems because the intention toward such systems is maximized by users' enjoyment or entertainment dimension. In other words, if hedonic systems are perceived as being low in perceived enjoyment, then users are less likely to develop positive attitudes towards their usage. The same phenomenon was demonstrated concerning utilitarian systems as well. Davis et al. (1992) demonstrated that enjoyment together with usefulness can account for up to 75% of the variance of intention to use computer system in utilitarian context. They were able to show not so strong but significant relationship between enjoyment and behavioral intention (regression of intention (BI) on enjoyment (PE), $\beta_{BI,PE} = 0.15$, p=0.016). They suggest that this type of finding will mitigate suspicions that an enjoyable computer system would encourage users to waste their time during working hours and would increase inappropriate use.

Almost similar results have been demonstrated in the study in which 471 managerial and professional respondents form several US-based companies and organizations were used. Enjoyment was found to have small but signifi-

cant effect on usage of computers (Igbaria, Parasuraman, & Baroudi, 1996). They could demonstrate results showing this connection to be statistically significant (regression of intention (BI) on enjoyment (PE), $\beta_{BI,PE}$ = 0.08, p<0.01).

The impact of enjoyment on attitude has been shown to be almost as high as the impact of ease of use on attitude (Van der Heijden, 2003). He studied the use of generic information web-portal and that use can be classified to be utilitarian. He could demonstrate that connection from perceived enjoyment to attitude was statistically significant (regression of attitude (ATT) on perceived enjoyment (PE), $\beta_{PE,ATT}$ = 0.23, p<0.001). The link from perceived enjoyment to intention to use was remarkable and significant (regression of behavioral intention (BI) on enjoyment (PE), $\beta_{BI,PE}$ = 0.22, p<0.05).

The power of enjoyment over and above perceived usefulness in the context of mixed use (mix of utilitarian and hedonic use of technology) has been demonstrated. Using the intention of PTT -service (push-to-talk over IP-network) perceived enjoyment has been shown to be a stronger determinant than perceived usefulness (Dickinger, Arami, & Meyer, 2008). They also suggested further studies on the effect of perceived enjoyment in the area of technology acceptance. They suggested that the research stance could be two-fold to study both the enjoying and functional factors in technology acceptance.

However, there are also opposite research results. It has been found that enjoyment has only a weak and insignificant effect on usage (Igbaria, Iivari, & Maragahh, 1995). They found out, using data from 109 Finnish companies using computers that enjoyment has non-significant effect on three dimensions of computer system use; on frequency of use, time of use and on number of tasks. They encouraged researchers for further studies on the relationships of enjoyment and usage because this link is influenced by various externals factors as well.

2.7 Summary

This Chapter 2 of the study contained a literature review on enjoyment, attitude and behavioral intention especially seen through the lens of technology acceptance in utilitarian, especially in the mandatory context. It was found out that in the literature in this is broad. Enjoyment, attitude and behavioral intention have been studied in the connection of technology acceptance from several standpoints. All these three factors are internal, intrinsic and hedonic factors from user's point of view. Hedonic internal factors have not been studied even close to the maximum. However, with the growing interest toward these factors, it seems that hedonic internal factors may have an important addition to technology acceptance models.

The research questions of this study were the following:

- Is attitude a reliable predictor of behavioral intention to use technology when the use is mandatory?

- Is enjoyment an antecedent of attitude and behavioral intention to use technology when the use is mandatory?

Based on this literature review giving answers to research questions above is not unambiguous. In the light of the reviewed literature the answer to the first question is "maybe yes". As seen above, there are research results indicating that attitude with its multidimensional characters can capture relevant information from the user's beliefs indicating his or her behavioral intention, but on the other hand, some research results suggest that attitude is not at all an antecedent of behavioral intention in mandatory context of technology use. For this reason researchers also suggest that this area needs more investigation in mandatory context.

The answer to the second research question is "probably yes". A thin amount of research results support the assertion that enjoyment is an antecedent of attitude and behavioral intention to use technology when the use mandatory. This can be seen especially regarding the latest research results.

After the literature review, an empirical test with the hypotheses was performed. The empirical part is introduced in the following chapter.

3 RESEARCH METHODOLOGY, RESEARCH MODEL, OPERATIONALIZATION AND DATA COLLECTION

To find answers to the research question of the current study also an empirical test was performed. According to the aim of the current study, the context of using the information system was a mandatory context, where users have small or no control at all over the selection of new technology which they were supposed to use. In order to test the effect of enjoyment and attitude on behavioral intention to use new technology in a mandatory context, the police organization of Finland was selected as a target user group for the empirical test. The reason tor this was very topical at the time of the test because the Finnish Police was planning to transfer most of their information related work caused by field operations from the office environment equipment to equipment installed in vehicles. Understanding various effects of intrinsic motivation factors was seen helpful for researchers and target users themselves to better utilize research results in the process of new technology adoption. In this chapter the technology challenges of the target users, methodology, research model, questionnaire and operationalization of the constructs, sampling, data collection, validity assessments of the measurement scales are introduced.

3.1 The Police Communication in Finland

3.1.1 Organization

The Finnish police organization has been recently restructured. Finnish Police Force is comprised of one law enforcement organization, the Finnish Police. It operates under the Ministry of the Interior, which is responsible for its supervision and guidance. The new police organization have has a low, two-tier organization. The first tier, the National Police Board operates under the Ministry of the Interior. The main responsibility of the National Police Board is to manage

the 11 local police departments. This includes guidance on their economic performance as well. The second tier is formed by the local police departments, national police units, and the Police College of Finland. The Finnish Security Intelligence Service and the National Bureau of Investigation form the new national units in the organization. The Finnish Border Guard and Finnish Customs are given in special cases the right of the police. For special police operations there are also special units, like The Police Incident Response Team for the detection and prevention of information security incidents, and a special unit for counter terrorism and for special operations which is called Special Operations Unit of the Helsinki Police Department. The Finnish Defence Forces have military police force for military operations only (Poliisi, 2014). In the pressure of economic issues new technology has been seen one of the methods to improve the performance of the police force with less operational financing.

3.1.2 Modes of Communication and Technological Ideas

The new technology is required in the Finnish Police Force in the near future to fulfil operational requirements in the new organization with less operational costs. The idea is for example to transfer most of the work caused by field operations from the office environments to vehicle environments. By using their normal police information systems via mobile apparatuses installed in vehicles police is expected to be capable to perform in servicing Finnish citizens. When police officers are introduced new technology for these new means of communication and new procedures of operations in the field, the technology acceptance may play a new role. The use is mandatory because police officers are obliged to use those systems which have been given to them. Instead of driving back to office from the scene of the incident police officers are expected to make all of their paperwork in vehicle environment. This would require several different mobile access systems (like 2G, 3G, TETRA, KTE/4G, WLAN, satellite) installed police on a vehicle. One presentation of a future Finnish police vehicle communication system is presented in FIGURE 5.
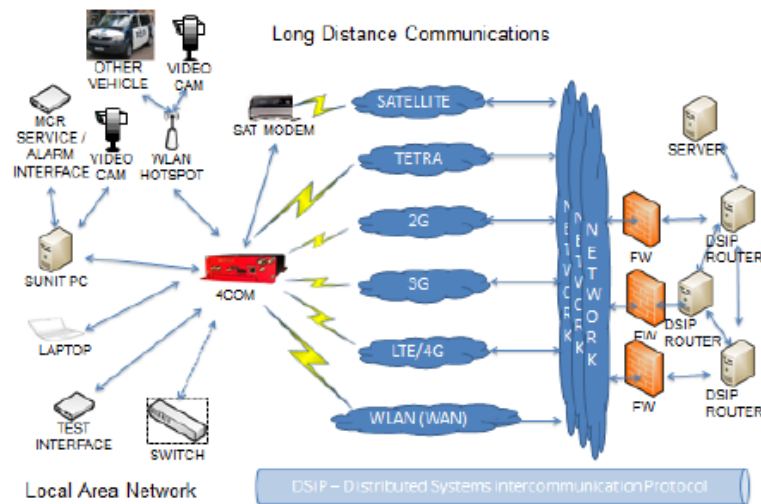
FIGURE 5 Communications system in future police vehicle from Rajamäki (2013)

The communication illustrated above requires a lot from the police vehicle as well in the future. One example of the future police car proposals is presented in FIGURE 6 (Rajamaki, 2013). According to this, a police vehicle would consist of standard van equipped with several changes in power supply systems, interfaces to vehicle normal control systems, lights, heating, cooling, etc., including changes in the vehicle body modifications.
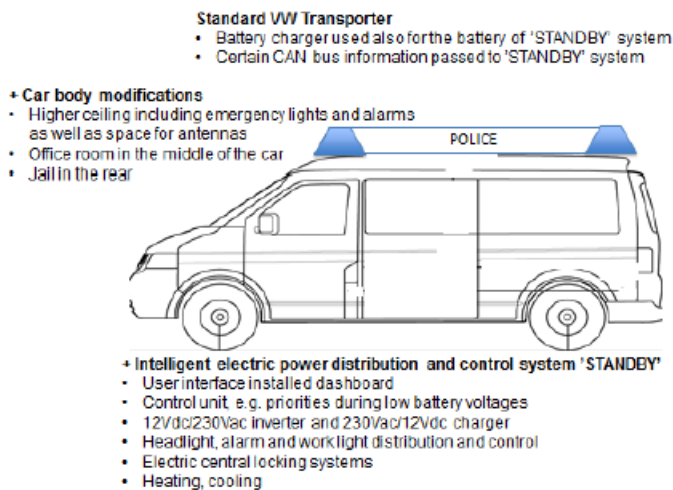
FIGURE 6 A van sized-police car demonstration from Rajamäki (2013)

To make all police officers in the field to fully utilize all technical innovations and systems, technology acceptance in that type of context may be one of the

key success factors for the new ways of operation of the newly established police organization in Finland. The current study may contribute in this process to understand the factors effecting new technology acceptance on personal, field police officer level.

3.2 Methodology

The methodology of the empirical part of the current research is a self-administered survey design (Järvinen & Järvinen, 2011). This means that the subjects participated to the survey without any support from the researcher but were supposed to fill the survey form independently according to the written instructions. The empirical part of the current research is quantitative. The aim of the empirical part is to test the fit of the research model with received data.

3.3 Research Model and Hypotheses

This section introduces the theoretical research model of the current research and the hypotheses derived from the theoretical foundations. The model is depicted in FIGURE 7.
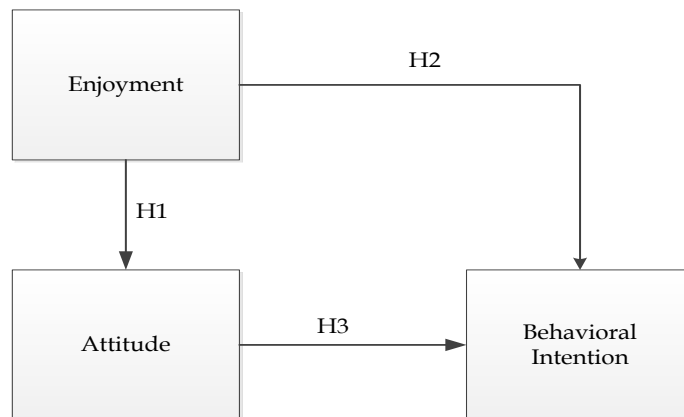
FIGURE 7 Research model

The structure of the research model is a result of the research problem statement, research questions, theory development and prior literature. The research model consists of the constructs of the latent factors for enjoyment, attitude and behavioral intention. Purpose of the model is to qualify or disqualify the hypothesized links between the constructs. Perceived enjoyment is hypothesized

to be a determinant of attitude (H1) and behavioral intention (H2), and attitude is hypothesised to be a determinant of behavioral intention (H3).

The impact of enjoyment on attitude has been shown to be almost as high as the impact of ease of use on attitude (Van der Heijden, 2003). He could demonstrate that connection from perceived enjoyment to attitude was statistically significant (regression of attitude (ATT) on perceived enjoyment (PE), $\beta_{PE,ATT}$ = 0.23, p<0.001). The link from perceived enjoyment to intention to use was remarkable and significant (regression of behavioral intention (BI) on enjoyment (PE), $\beta_{BI,PE}$ = 0.22, p<0.05).

Regarding the effect of enjoyment on behavioral intention have been demonstrated. In the study of business companies and organizations enjoyment was found to have small but significant effect on usage of computers (Igbaria et al., 1996). They demonstrated this connection to be statistically significant (regression of intention (BI) on enjoyment (PE), $\beta_{BI,PE}$ = 0.08, p<0.01). Hence, the following two hypotheses regarding enjoyment are proposed:

H1: Perceived enjoyment has direct positive effect on attitude.
**H2**: Perceived enjoyment has direct positive effect on behavioral intention.

Atttude has been earlier in this study introduced as a complicated construct. It is described (Fishbein & Ajzen, 1975) as

"a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object".

According to this definition, it has features which are consistently favourable or unfavourable toward the object. Some other research results suggest that attitude has a strong, direct and positive effect on intentions. This has been qualified on several research settings (Ajzen & Fishbein, 2005; Dabholkar & Bagozzi, 2002). The effect of attitude on behavior is based on the proposal of Ajzen and Fisbein, who proposed (Ajzen & Fishbein, 2005) that attitude as a construct has also a dimension toward *performing a specific behavior* and which is referred as *attitude toward a behavior.* This is generally used also in the context of technology acceptance research. Hence, the following hypothesis is proposed:

H3: Attitude has direct positive effect on behavioral intention.

3.4   Questionnaire and Operationalization of the Constructs

In this section the operationalization of the measurement of latent constructs is introduced. Because theoretical latent constructs cannot be measured directly, they were measured indirectly using measurement scales. Observable indicators which are assumed to be reliable representatives of those constructs were

measured. The operationalization of the constructs and data collection was done at the same time as those in the study of Kurkinen (2012).

The measurement scales of the constructs were taken from the prior literature of technology acceptance and information systems research. The items were translated into the Finnish language and then cross-checked with native Finnish speakers. Then the items of scales were reviewed together with the target police staff by the team of four police reviewers. The intention to use a future mobile application was tested using the methods proposed by Davis (2004). According to him pre-prototype testing can be used in predicting the user acceptance in IT systems instead of a real IT system. The subjects were shown a 12 minutes video which presented the features and functionality of the future mobile IT system for the Finnish Police Force. After that they filled in an electronic questionnaire. In the questionnaire a seven point Likert scale was used for perceived enjoyment and behavioral intention. Attitude was measured using a five-point semantic differential scale consisting of bipolar adjective pairs.

In the measurement scales the lower item value on the scale meant agreement with the positive statement, whilst the higher value meant agreement with the negative statement. For attitude the scale was just opposite. The questionnaire was implemented by the Finnish Police using their electronic survey system Webropol (Webropol, 2014). The questionnaire was sent to subjects using an e-mail containing an introduction part, instructions how to attend to the survey, and two web-links; one to the video to be watched first and another link to the questionnaire.

Behavioral intention

The operationalization of behavioural intention was adopted from Wu et al (2007) who used the scale in the professional, non-volitional use (J. Wu, Wang, & Lin, 2007). It originates from original TAM scales (Davis, Bagozzi & Warshaw 1989, Davis 1989) and contained three items. The measurement scale for behavioural intention is presented in TABLE 2.

TABLE 2 Measurement scale for behavioural intention (BI)

Behavioural Intention (BI)	
BI1	I would intend to use the system in my daily work as often as needed.
BI2	Whenever possible, I would intend to use the system in my daily job.
BI3	I would estimate that my chances of using the system in my daily job are frequent.

Perceived enjoyment

The operationalization of perceived enjoyment was adopted and modified from (Venkatesh, 2000). Scale for perceived enjoyment is depicted in TABLE 3.

TABLE 3 Measurement scale for perceived enjoyment (PE)

Perceived Enjoyment (PE)	
PE1	I find using the system to be enjoyable.
PE2	The actual process of using the system is pleasant.
PE3	I have fun using the system.

Attitude

The operationalization of attitude was adopted from (Bhattacherjee & Premkumar, 2004). Attitude was measured using a five-point semantic differential scale consisting of bipolar adjective pairs. Attitude scale is depicted in TABLE 4.

TABLE 4 Measurement scale for attitude (ATT)

Attitude (ATT)	
	All things considered, using the system will be a
ATT1	bad idea….good idea
ATT2	foolish move…wise move
ATT3	negative step…positive step
ATT4	ineffective idea…effective idea

All measurement scales are presented in Annex 1.

3.5   Sampling and Data Collection

Data for the current study was collected as a part of study by Kurkinen (2012). Data sampling method was stratified sampling (Metsämuuronen, 2009). (Metsämuuronen, 2009)In this way, instead of totally random sampling, it was possible to have samples from different Finnish Police departments in order to achieve a balance between urban and rural police departments, and from different locations in the country. Data was collected electronically at spring in 2012 from selected 16 Finnish police department covering different parts of the country. Subjects were able to attend the query anonymously. There were no compensations to the subjects for attending. Moreover, attending to the survey was totally voluntary. Subjects were allowed to attend the survey during their working hours using their police departments' computers in office environment.

3.6   Validity Assessments of the Measurement Scales

The validity of the measurement scales which were used in the study were ensured in various ways. The measurement validity which expresses the degree to which the items in the questionnaire describe the concept which is to be meas-

ured, was ensured by using face validity, in which the items of the question-naire are put under evaluation to determine whether the questions really measure that concept it should (Seale, 2004). The face validity was guaranteed in three steps. Firstly, the development of the scales was based on the use of validated scales taken from the existing literature.

Secondly, the developed scales they were carefully translated by the author into the Finnish language from their original English versions and cross-checked with native speaking Finnish university colleague researchers. After that they were reviewed by the team of Finnish field police officers to ensure that the language which was used in the survey is made using police vocabulary and is understandable by a normal police officer. After the review modifications were made accordingly.

Thirdly, the questions of the scales were put under a two phase sorting procedure. The aim of that sorting procedure was to measure what is the sorting agreement between the raters, it is, how well sorters are able to sort the questions of the model into their correct constructs. The method by which the sorting agreement were analysed were calculating overall hit ratio based on placement scores (Moore & Benbasat, 1991) and Fleiss' kappa calculation (Fleiss, 1971). Both overall hit ratio (85 %) and Fleiss kappa (0.75, S.E. 0.069) were acceptable.

After rating and validity, the scales were put under pilot testing for 76 pilot subjects at the Police College of Finland in Tampere. After the pilot testing the scales were then accepted to be used in the questionnaire.

The generalizations of the results of the research relates to external validity. External validity is dependent of the sampling of the research data. In the current research, the sampling method was stratified sampling (Metsämuuronen, 2009). In the current study the population of the research are the Finnish Police officers working in field operations. Their amount is about 5000 officers (Finnish National Police Board, 2011). Hence, the results of this study should be generalized to that amount of population. It is natural that not all police officers can be studied, so the data which is collected using samples from a population, must be representatives of that population. The amount of respondent was 267 representing approximately 5 percent of the whole population. This indicates the sampling fraction over 5 percent and presents an acceptable generalization capability of the results to the whole population of 5000 field police officers.

3.7 Structural Equation Modelling (SEM)

Structural equation modelling (SEM) is a comprehensive multivariate statistical methodology which can be used to represent, estimate and test the relationships among observed and latent variables. It can be referred as a second generation model (Gefen, Straub, & Boudreau, 2000; Gefen, Straub, & Rigdon, 2011). The biggest difference between SEM and most of the first generation regression models such as the Analysis of Variance (ANOVA) and the Multivariate Analy-

sis of Variance (MANOVA) is that SEM allows the modelling of all relationships simultaneously whereas the other methods allow only one layer of the relationships to be analysed at a time.

SEM is suitable especially for the studies which a researcher already knows that there is an existing theory behind the relationships of the variables in question (Metsämuuronen, 2009).

3.8 Utilization of SEM method in the Current Study

In SEM there are two parts: the measurement part and the structural part. The measurement part consists of the loadings of the observed items of the expected latent variables. It is analysed using a confirmatory factor analysis (CFA). The structural part includes estimating the relationships of the latent constructs. There is a hypothesized causation between the dependent and independent constructs. One of the benefits of the SEM model and analysis is that it is able to show which latent constructs have a direct or indirect effect on other dependent latent variables revealing the mediating effects of the constructs as well (Gefen et al., 2011; A. Wu & Zumbo, 2008). Using SEM analysis, it is possible to assess the structural model and measurement model within the same analysis. For this reason SEM can also be understood to be a combination of confirmatory factor analysis and path analysis. Thus, the combined analysis of the structural model and the measurement model enables the measurement errors of the observed variables to be included in the analysis and also the factor analysis to be combined in one operation. As a result, factor analysis and hypothesis testing is performed in the same analysis (Ibid.).

SEM is popular method in behavioural and social sciences. It is used in information technology research as well. It can be used not only for confirmatory research but also for generating the research model. If the hypothesized model does not fit the measurement data, the model can be modified and a new analysis can be performed using SEM. This can be iterated until a acceptable measurement model is found which is compliant with the content and the theory requirements of the model. However, SEM is confirmatory in nature and the basic idea of it is lost, if the model is changed radically during the analyzing phase (Metsämuuronen, 2009).

Before the SEM analysis is used the type of SEM should be selected. There are two most used types of SEM in information systems research, based on statistical parameters they are using in estimations. The partial least squares SEM (PLS-SEM) uses variances whereas covariance based SEM (CB-SEM) uses covariances (Gefen et al., 2011). PLS-SEM uses a method which maximises the variances of single latent variables of the model. CB-SEM aims to maximise the fit of the model to empirical data. Hence, PLS-SEM is more suitable for exploratory research models whereas CB-SEM is more suitable for confirmatory models having mature theories behind the constructs in the model (Gefen et al., 2000). The study at hand uses constructs to measure the latent factors from the

prior literature. They all have been validated for several types of research settings. Even though this study uses new hypotheses between the latent factors in studying the paths between perceived enjoyment, attitude and behavioral intention, the nature of the study is confirmative. For this reason the type of SEM for the current study was selected to be CB-SEM. From this onwards the abbreviation SEM is used to mean CB-SEM.

In creation of SEM, there are five stages which can be distinguished (Schumacker & Lomax, 2010; Weston & Gore, 2006). Those five phases are model specification, model identification, model estimation, model testing and model modification. In the present study this five step approach was used.

In the testing phase goodness of the model is tested if the observed data fits with the model. The parameters which the model estimation gives are compared with the same parameters from data. In this study the analyzing software was Mplus v 6.12 (Muthen & Muthen, 2014a). The Mplus software produces several fit testing parameters and indices as an output. The usage of those fit indices assessing the model fit is described in the following.

The most common method to express whether the data accepts or rejects the model is overall goodness-of-fit test using χ^2 (chi-square) (Byrne, 2012; Weston & Gore, 2006). It is an absolute fit index and it evaluates the degree to which the covariance matrix of the model matches the covariance matrix of data. A small χ^2 value is a signal of a good fit but a large value is a symptom of a non-acceptable fit. The degrees of freedom (df) which are needed for the χ^2 tests are calculated based on the numbers of parameters to be evaluated and on available parameters. The p-values of the χ^2 test with the existing degrees of freedom indicate the fit of the model. When p-values with calculated degrees of freedom are ≥0.05, the model has a good fit. This criterion has been used in the current study.

The parameter estimates of the model should be statistically significant. Hence, for a 0.05 significance level |t=value| it should be > 1.96. In the current study this criteria is used as well.

Root Mean Square Error of Approximation (RMSEA) is an absolute fit index, which shows the fit of a model using the discrepancy function (Browne & Cudeck, 1993). The value of RMSEA < 0.05 expresses a close fit; 0.05 < RMSEA < 0.08 expresses reasonable fit and a model having a value of RMSEA > 0.1 would not be used. (Browne & Cudeck, 1993, p.144). If the RMSEA = 0, there is an exact fit. The confidence interval is also calculated around the value of RMSEA. For the well-fitting model the lower limit of the confidence interval (p=0.05) should be near zero and the upper limit should be less than 0.08 (Hooper, Coughlan, & Mullen, 2008).

Standardized Root Mean Square Residual (SRMR) is an absolute measure of fit. It indicates the average of the standardized residuals between the observed and predicted values in their corresponding covariance matrices (Chen, 2007). When SRMR equals zero it indicates an exact fit of the model with measurement data. The benefit of SRMR is that it is almost independent of the sample size. The acceptance of SRMR is based on the following values. The values

SRMR < 0.05 indicate acceptable fit. Also value up to SRMR < 0.08 are considered as acceptable (Weston & Gore, 2006). Models having a high number of parameters and if the sample size is large, SRMR will easy achieve low values (Hooper et al., 2008).

Comparative Fit Index (CFI) is an incremental fit index for model sufficiency, comparing the model to a null model (Chen, 2007). The measurement range of CFI is between 0 and 1. The acceptable limit of CFI is 0.9. The value of CFI > 0.95 is an sign of a good fit (Hooper et al., 2008).

Tucker-Lewis index (TLI) is an incremental fit index. It is also called the Non-normed Fit Index (NNFI). It is a result when the χ^2 values of the model are compared to the χ^2 values of the null model. The null model is presented as the worst case scenario having a zero fit of the parameters. Values of TLI range from 0 to 1. Values TLI ≥0.95 are acceptable (Byrne, 2012). TLI prefers simple models and is sensitive to large sample sizes, underestimating even sample sizes of less than 200 samples (Hooper et al., 2008).

For large sample sizes (for example even for N ≥250-300), an χ^2 test may reject the model fit (Stommel, Wang, Given, & Given, 1992). For this reason there are additional parameters which are not dependent of the sample size. Normed Fix Index (NFI) can be used to test the model fit if the the χ^2 test rejects the model fit test caused by a large sample size. If the χ^2 test is rejected and the value of NFI is ≥0.95, then it can be assumed that the rejection is caused by a large sample size (Hooper et al., 2008).

One of the methods to assess scale reliability is Cronbach's Alpha (Cronbach, 1951). It is used to assess the scale reliability via internal consistency. Internal consistency is a measure if the items of the scale are measuring the same scale. It should be determined before the scale is used for testing. Cronbach's alpha values can be in the area between 0 and 1. There are several proposals what the acceptable level of the alpha value is. The alpha value for the scale should be > 0.6 (Metsämuuronen, 2009) or > 0.7 (Gefen et al., 2000; Tavakol & Dennick, 2011) . Because the length of a scale also affects its coefficient alpha value, a high value of Cronbach's alpha does not necessarily mean a high reliability. With short scales it may achieve values that are too low. High values of Cronbach's alpha may indicate a redundancy of the items meaning that that several items are measuring the same construct. In the current study Cronbach alpha was computed for each measurement scale with PASW Statistics 18 software.

3.9 Summary

In this chapter the empirical research methodology, research model, questionnaire and operationalization of the constructs, sampling, data collection, validity assessments of the measurement scales were introduced.

4   RESULTS

In this chapter the results of the empirical study are presented. The chapter contains the descriptive results, measuring model development, estimation of individual measurement model, reliability and validity review of the constructs, analysis of common method variance, estimation of the whole measurement model, SEM analysis and review of the results followed by the summary of the chapter.

4.1   Descriptive Results

When the query was closed and data collected, daya was pre-processed with PASW Statistics software (PASW Statistics 18, 2014) and with Mplus software (Muthen & Muthen, 2014a). Originally 302 responses were received from selected 16 police departments. After having removed 35 responses from high rank police officers, 267 valid responses were available for the analysis. This deletion of responses from high rank police officers was based on the suggestion in several prior studies in mandatory use so that the users who do not use the system under study in reality, should not be used as subjects in studies regarding those systems (Hartwick & Barki, 1994; Moore & Benbasat, 1991; Rawstorne et al., 2000).

The summary of demographic characteristics of the accepted respondent is shown in TABLE 5.

TABLE 5   Demographic characteristics of respondents

	N		Mean	Median	Std.deviation
	Valid	Missing	Mean	Median	Std.deviation
Age	267	0	40.85	40.0	9.365
Length of Career	261	6	16.88	14.0	10.465

The age of the presondents varied between 22 and 58 years. The mean age was 40.9 years and median 40 years.

The frequencies and percentages of gender of respondents are presented in TABLE 6.

TABLE 6 Frequencies and percentages of gender of respondents

Gender	Frequency	Percentage	Valid percentage
Male	243	91.4	91.4
Female	23	8.6	8.6
Total	266	99.6	100.0
Missing	1	0.04	

As seen in the table above, the share between male and female subjects were 91.4 percent and 8.6 percent accordingly. Male police officers were over-represented in the survey because according to the Finnish police statistics 11.7 percent of the Finnish uniformed police officers were female (Finnish National Police Board, 2009).

In the survey respondents gave their assessments on variables of behavioral intention, attitude and perceived enjoyment. For perceived enjoyment and behavioral intention they were given using a 7-point Likert-scale having the following steps: 1: *strongly agree,* 2: *moderately agree,* 3: *somewhat agree,* 4: *neutral* (neither disagree nor agree), 5: *somewhat disagree,* 6: *moderately disagree and* 7: *strongly disagree.* The lowest number indicated the strongest level of conformity with the positive claim in question. The number 8 was for reserved for the possibility to answer "*I cannot or I do not want to answer* "which was treated as a missing value. Attitude was measured using a five-point semantic differential scale consisting of bipolar adjective pairs. Because attitude was measured using the scale indicating a negative attitude with a smaller number and a positive attitude with a bigger number on the scale, all attitude responses were turned upside down before the analysis to get all responses being comparable with each other.

The means, medians and standard deviations of the measured items (behavioural intention, perceived ease of use, perceived usefulness, compatibility and social influence) are presented in TABLE 7.

The respondents gave very positive assessment on every item in each of the scales, because all Likert-scales values were under the neutral value 4 in the scale. The mean of all items measuring behavioral intention to use was 2.83 (SD=1.6). This indicates that respondents would use the system if that type of system was made available to them. The mean for items of perceived enjoyment was 3.64 (SD= 1.3) indicating that respondents were almost neutral regarding the perceived enjoyment towards using the system. The mean of all items measuring attitude was 2.92 (SD=1.3). This indicated that respondents' attitude was somewhat positive towards using the system.

TABLE 7 Means, medians and standard deviations for measured items

Item	N		Mean	Median	Standard deviation
	Valid	Missing			
BI1	264	3	2.70	2	1.5
BI2	263	4	3.05	3	1.7
BI3	267	0	2.67	2	1.6
PE1	261	6	3.73	4	1.6
PE2	265	2	3.62	3	1.8
PE3	262	5	3.61	3	1.6
ATT1	265	2	2.80	2	1.7
ATT2	262	5	3.16	3	1.8
ATT3	265	2	2.84	3	1.7
ATT4	264	3	2.88	3	1.7

For SEM analysis it is important to have a view of distribution of data. Hence, the normality of the variables was checked in the current study by checking kurtosis and skewness of data. Kurtosis is a measure of the peakedness of the probability distribution of the data, and skewness is a measure of the symmetry of the probability distribution of data (Byrne, 2012). For the SEM analysis data is expected to be multivariate normal. Possible kurtosis has a strong effect on the tests of variances and covariances, whereas skewness affects on tests of means (DeCarlo, 1997). Hence, as the SEM analysis is based on the use of covariance structures, existence of kurtosis in data is a risk for the correctness of the results. The non-normality indicators of skewness and kurtosis with responding standard errors for the observed variables are presented in TABLE 8.

TABLE 8 Skewness and kurtosis with their standard errors of observed variables

Item	Skewness	Std. error	Kurtosis	Std. error
BI1	1.116	0.150	0.748	0.299
BI2	0.834	0.150	-0.087	0.299
BI3	1.163	0.149	0.673	0.297
PE1	0.361	0.142	0.654	0.283
PE2	0.381	0.140	-0.886	0.280
PE3	0.457	0.142	-0.622	0.282
ATT1	1.089	0.150	0.384	0.298
ATT2	0.545	0.150	-0.469	0.300
ATT3	0.814	0.150	0.013	0.298
ATT4	0.748	0.150	-0.093	0.299

All variables exept BI2, ATT2, ATT3 and ATT4 were found to have statisctically significant kurtosis and skewness. To reduce the risk of kurtosis and skewness in SEM analysis, a robust MLM-estimator was selected for the Mplus-

tool. MLM is a sophisticated version of the maximum likelihood (ML) estimator implemented in MPlus (Muthen & Muthen, 2014b).

4.2 Measurement Model Analysis

The measurement model for the current study was depicted in FIGURE 7. It has been suggested that before the SEM analysis is done, a confirmatory factor analysis (CFA) should be done for the model in order to see if it is accuracy enough (Byrne, 2012). According to this suggestion the measurement model was estimated using Mplus software. The robust MLM estimation was used. The χ^2 test rejected the model fit (χ^2 (32) = 100.579, scaling correction value = 1.2549, p-value = 0.000). The goodness-of-fit indices supported the fit (RMSEA = 0.090, CFI = 0.977, TLI = 0.968, SRMR = 0.018). All factor loadings were significant. However, there were large modification index (MI=44.972) that ATT1 would be an item for behavioral intention (BI). This showed a shadow over the construct validity caused by discriminant validity. Hence, there were good reasons to start making individual estimations for each constructs in the CFA framework to check the validities of the constructs properly. These estimations are introduced next.

4.3 Estimation of Constructs

To begin with the individual construct estimations, first the measurement model for behavioural intention (BI) was estimated. The model was just-identified (amount of unknown parameters equals the amount of known parameters as there are three items in the scale). For this reason the model fit could not be tested. However, the parameters could be estimated. The standardized factor loadings were significant and high, being 0.919, 0.914 and 0.896 for BI1, BI2 and BI3 respectively. Item reliabilities were high, the squared multiple correlations (R^2) were significant and for BI1, BI2 and BI3 they were 0.844, 0.836 and 0.802 accordingly. Cronbach's alpha of 0.934 indicated good scale reliability supported by a good composite reliability of 0.935 indicating good internal consistency. The average variance extracted value (AVE = 0.827) indicated a good convergent validity. There were no modification indices proposing modifications to the model. The model of behavioural intention is illustrated in FIGURE 8.
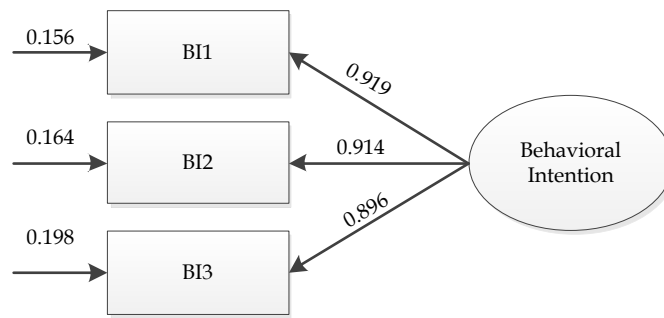
FIGURE 8 Estimated measurement model for behavioural intention (standardized values)

Then the model for perceived enjoyment was estimated next. Like in the previous estimation, the model was just-identified. For this reason the model fit could not be tested. However, the parameters could be estimated. The standardized factor loadings were significant and high, being 0.905, 0.930 and 0.925 for PE1, PE2 and PE3 respectively. Item reliabilities were high, the squared multiple correlations (R^2) were significant and for PE1, PE2 and PE3 they were 0.819, 0.864 and 0.856 accordingly. Cronbach's alpha of 0.944 indicated good scale reliability supported by a good composite reliability of 0.943 indicating good internal consistency. The average variance extracted value (AVE = 0.846) indicated a good convergent validity. There were no modification indices proposing modifications to the model. The model of behavioural intention is illustrated in FIGURE 9.

FIGURE 9 Estimated measurement model for perceived enjoyment (standardized values)

Then, the model for attitude was estimated. The χ^2 test rejected the model fit (χ^2 (2) = 11.975, scaling correction value = 1.6110, p-value = 0.0025). The goodness-of-fit rejected the fit as well (RMSEA = 0.137, CFI = 0.990, TLI = 0.970, SRMR = 0.011). All factor loadings were significant. The RMSEA-index indicated that the model is not adequate as it should be less than 0.5 for good fit, and index values above 0.1 should not be accepted (Hooper et al., 2008). All other indexes would have been acceptable. There were no large modification indexes helping

to make any modifications to the model. The squared multiple correlations (R^2) were 0.822, 0.794, 0.920 and 0.902 for item ATT1, ATT2, ATT3 and ATT4 respectively. The value of R^2 of item ATT2 was the lowest in the scale. It was above, like all other values as well, the recommended value of 0.7 (Tavakol & Dennick, 2011). Cronbach's alpha of 0.961 indicated good scale reliability supported. The calculation procedure of Cronbach's alpha revealed that removing any item would not make the alpha value remarkably better. When the model as a whole was estimated before individual model estimations, it was suspected that ATT1 would be loading on the incorrect construct causing worries about discriminant validity. Moreover, as was seen in the descriptive results in 4.1, item ATT1 in attitude scale showed statistically significant leptokurtosis. All other items had no significant kurtosis. Kurtosis in data in SEM analysis may have serious effects on calculating variances and covariances and is a concern (DeCarlo, 1997). Even though a robust MLM-estimator was used in Mplus software, which should be very resilient towards any non-normalites in data (Muthen & Muthen, 2014b), like kurtosis, it was suspected that kurtosis may affect on the result. Because all other items; ATT2, ATT3 and ATT4, were showed not have kurtosis, it was decided to leave ATT1 out from the scale of attitude. Then the model was estimated without ATT1. Like in the previous estimations, the model was just-identified. For this reason the model fit could not be tested. However, the parameters could be estimated. The standardized factor loadings were significant and high, being 0.879, 0.975 and 0.940 for ATT2, ATT3 and ATT4 respectively. Item reliabilities were relatively high, the squared multiple correlations (R^2) were significant and for ATT2, ATT3, and ATT4 they were 0.772, 0.951 and 0.884 accordingly. Cronbach's alpha of 0.951 indicated acceptable level of scale reliability supported by a good composite reliability of 0.952 indicating good internal consistency. The average variance extracted value (AVE = 0.869) indicated a good convergent validity. There were no modification indices proposing modifications to the model. The model of attitude is depicted in FIGURE 10.
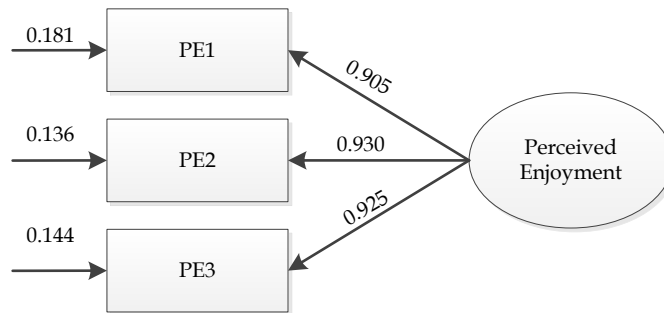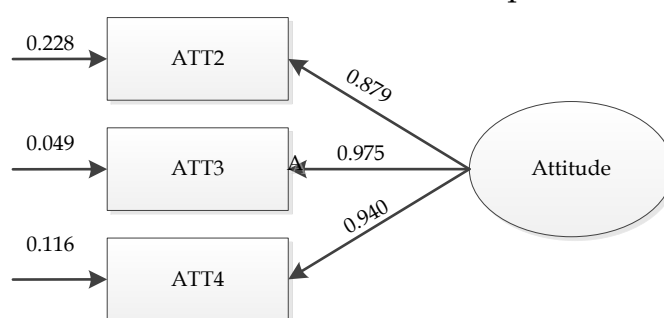

FIGURE 10 Estimated model for attitude (standardized values)

As a summary of the individual model estimations the standardized factor loadings, standard errors, item reliabilities for observed variables and

Cronbach's alphas and composite reliabilities for latent factors are presented in TABLE 9.

TABLE 9 Standardized factor loadings, standard errors, item reliabilities for observed variables and Cronbach's alphas and composite reliabilities for latent factors

Factor	Item	Factor loading	Std. error	Item reliability (R^2)	Cronbach's alpha	Composite reliability
Behavioural intention	BI1	0.919	0.019	0.844	0.934	0.935
	BI2	0.914	0.021	0.836		
	BI3	0.896	0.031	0.802		
Perceived enjoyment	PE1	0.905	0.018	0.819	0.944	0.943
	PE2	0.930	0.012	0.854		
	PE3	0.925	0.023	0.856		
Attitude	ATT2	0.879	0.032	0.772	0.952	0.952
	ATT3	0.975	0.010	0.951		
	ATT4	0.940	0.020	0.884		

In order to verify the factor structure a confirmatory factor analysis (CFA) with three factors was done. The results of CFA are presented in TABLE 10. In the table, the loadings below 0.4 are removed for clarity.

TABLE 10 Factor loadings on latent constructs

	BI	ATT	PE
BI1	0.784		
BI2	0.497		
BI3	0.647		
ATT2		0.619	
ATT3		0.816	
ATT4		0.730	
PE1			0.811
PE2			0.707
PE3			0.727

4.4 Reliability and Validity of Constructs

The reliability of the items was evaluated by examining the composite reliability. All of them were found to be high indicating good reliability of items. The construct reliability evaluation was based examining the Cronbach's alpha values of the constructs. All of them were found to be high indicating construct reliability.

The convergent and discriminant validity of the constructs was evaluated in the method which is proposed by Fornell and Larcker (Fornell & Larcker,

1981).The method is based on the use of the average variance extracted (AVE) which should be more than 0.5. All of the AVE's of the construct were above that value ranging from 0.827 to 0.869 showing good convergent validity.

The discriminant validity was using the same AVE value. According to Fornell and Larcker the square root of AVE should be bigger than the correlation of that construct with other constructs. Based on this method, all construct possessed good discriminant validity. The AVEs, square root of AVEs, and correlations between the constructs are presented in TABLE 11.

TABLE 11 AVEs, square roots of AVEs and correlations of the constructs.

Construct	AVE	BI	ATT	PE
BI	0.827	**0.909**		
ATT	0.869	0.944	**0.932**	
PE	0.846	0.943	0.899	**0.920**

The table reveals that the square roots of AVE's of all constructs are smaller than their corresponding correlations with other constructs. This may be a symptom of weak discriminant validity.

Generally, in order to see is the constructs have discriminant validity, Wald test can be used (Wald, 2004). It is a pair-wise test of models between two factors where the correlation of two factors in the other model under test is set to 1 which means a full correlation between them, whereas in the other model the correlations can be freely estimated. The significance of the difference between these models are then tested with χ^2-test. If the result in χ^2-test is significant there is difference between the models and there is discriminant validity between the constructs. The Wald-test between the constructs was performed in Mplus software. All the differences were significant. The results indicated that there was discriminant validity. The results of the Wald tests are shown in TABLE 12.

TABLE 12 Discriminant validity χ^2 test results

Factor pair	χ^2	Degrees of freedom	p-value
BI – ATT	19.807	1	0.000
BI – PE	20.865	1	0.000
ATT – PE	23.170	1	0.000

4.5 Common Method Variance

The empirical part of the current study was based on data collected by single method, self-reported electronic survey system using Likert scales for enjoyment and behavioral intention, and 5 point semantic differential scale for bipo-

lar adjective points to measure attitude of respondents. This method may cause a bias in answering because respondents fill the survey at the same point of time causing possibly an issue that the actual phenomenon under investigation becomes hard to separate from this spurious covariance caused by the method itself. This is called common method variance (CMV) (Malhotra, Kim, & Patil, 2006). According to the newest proposals for SEM analysis also the bias caused by the common method should be checked (Gefen et al., 2011). In order to see if there is CMV in data a Harman's single factor test can be done as suggested by Malhotra et al. In this test a confirmatory factor analysis (CFA) with one factor is done and checked if all items are loaded to this one factor. If there is strong CMV in data, it can be verified with χ^2-test from the CFA results. This Harman's single factor test was performed for data of the current study. The result of χ^2-test indicated that single factor model did not fit with data ($\chi^2(28)=601.760$, scaling correction factor= 1.1296,0=0.000). Based on the results of this test, there was no bias caused by CMV in data of the current study.

4.6 Measurement Model Estimation

In the previous section individual construct of the measurement model were estimated separately. Some changes were made for the structure of attitude. Following this individual estimations the measurement model was estimated as a whole. The χ^2 test rejected the model fit ($\chi^2 (24) = 37.852$, scaling correction value = 1.2051, p-value = 0.0359). However, the goodness-of-fit indices supported the fit (RMSEA = 0.046, CFI = 0.995, TLI = 0.992, SRMR = 0.013). All factor loadings were significant. As the NFI index (NFI=0.986) was high, it gave an indication that the reason for the reject of model may be caused by the sample size. However, on modification index (MI= 9.140) suggested that if the error terms of items BI1 and BI3 were allowed to covariate, the model fit would be better accordingly. When that change was implemented into the model, χ^2 test accepted the model fit ($\chi^2 (23) = 29.682$, scaling correction value = 1.1827, p-value = 0.1588). Moreover, the goodness-of-fit indices supported the good fit (RMSEA = 0.033, CFI = 0.997, TLI = 0.996, SRMR = 0.011). The 90% confidence interval of RMSEA (0.00; 0.064) and the probability of RMSEA to be less than 0.05 (p=0.793) supported good model fit with data. The modification indices did not suggest any changes to the model. Correlations between the latent factors BI, ATT and PE are presented in TABLE 13.

TABLE 13 Correlations between the latent factors BI, ATT and PE

	BI	ATT	PE
BI	1		
ATT	0.948	1	
PE	0.948	0.899	1

The standardized estimates of the loadings on constructs, standard errors (S.E.), t-values and p-values are presented in TABLE 14.

TABLE 14 Standardized factor loading estimates, standard errors (S.E.), t-values and p-values

Factor	Item	Estimate	S.E.	t-value	p-value
Behavioural intention	BI1	0.882	0.023	37.912	0.000
	BI2	0.948	0.011	87-462	0.000
	BI3	0.869	0.028	30.534	0.000
Perceived enjoyment	PE1	0.896	0.017	53.231	0.000
	PE2	0.930	0.010	97.444	0.000
	PE3	0.932	0.022	41.891	0.000
Attitude	ATT2	0.886	0.032	28.034	0.000
	ATT3	0.967	0.009	109.224	0.000
	ATT4	0.945	0.019	49.328	0.000

The correlations of items of the constructs are presented in TABLE 15 . As seen in the table, all correlations are positive and are high.

TABLE 15 Correlations of the items of the constructs

Item	1	2	3	4	5	6	7	8	9
BI1	1.000								
BI2	0.840	1.000							
BI3	0.823	0.819	1.000						
ATT2	0.723	0.792	0.719	1.000					
ATT3	0.772	0.833	0.792	0.857	1.000				
ATT4	0.761	0.824	0.759	0.826	0.917	1.000			
PE1	0.700	0.761	0.682	0.710	0.735	0.747	1.000		
PE2	0.772	0.806	0.748	0.730	0.775	0.759	0.41	1.000	
PE3	0.739	0.825	0.742	0.753	0.781	0.763	0.837	0.860	1.000

4.7 Full SEM Model Estimation

The final phase in SEM analyse (before possible changes) is the testing of the full SEM model with data. In this phase the path coefficients between latent factors are estimated all the same time. Then the fit is tested using χ^2 test. The full model was estimated. The χ^2 test accepted the model fit (χ^2 (23) = 29.682, scaling correction value = 1.1827, p-value = 0.1588). Moreover, the goodness-of-fit indices supported the good fit (RMSEA = 0.033, CFI = 0.997, TLI = 0.996, SRMR = 0.011). The 90% confidence interval of RMSEA (0.00; 0.064) and the probability of RMSEA to be less than 0.05 (p=0.793) supported good model fit with data. The modification indices did not suggest any changes to the model.

The estimated path coefficients were all significant. The effect of perceived enjoyment on behavioral intention was 0.476 ((S.E.=0.063, t=7.567, p=0.000) and on attitude was strong and was 0.868 (S.E.=0.018, t=47.715, p=0.000). Hence, hypothesis H1: *Perceived enjoyment has direct positive effect on attitude* and hypothesis H2: *Perceived enjoyment has direct positive effect on behavioral intention* were both supported. The effect of attitude in behavioral intention was 0.505 868 (S.E.=0.067, t=7.549, p=0.000). Hence, also hypothesis H3**:** *Attitude has direct positive effect on behavioral intention* was supported. To conclude, all hypotheses presented in the current study were supported in the empirical test.

The full estimated SEM model with estimated factor loadings, residual variances, R^2 -values, and path coefficients is presented in FIGURE 11.
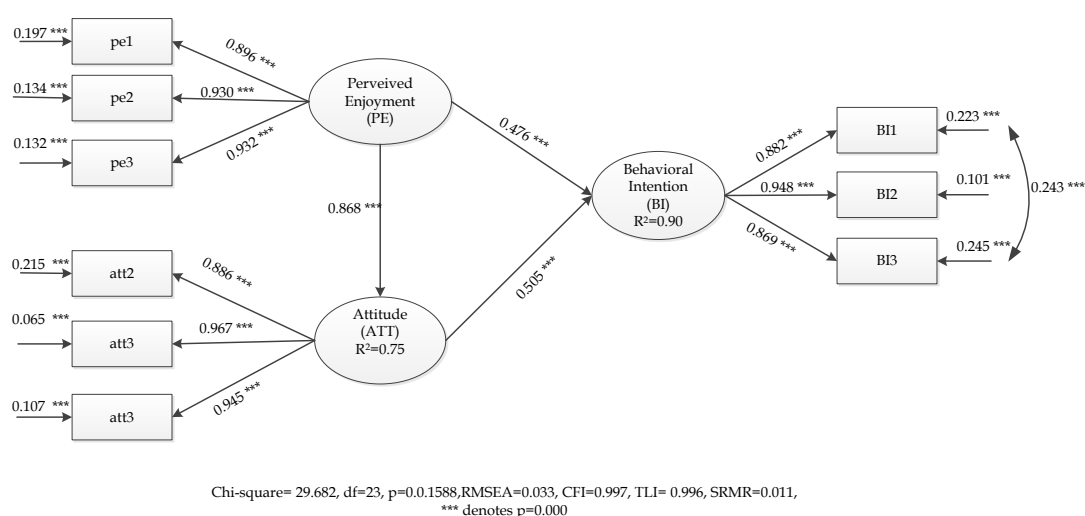

Chi-square= 29.682, df=23, p=0.0.1588,RMSEA=0.033, CFI=0.997, TLI= 0.996, SRMR=0.011,
*** denotes p=0.000

FIGURE 11 Estimated SEM model with estimated factor loadings, residual variances, R^2 -values, and path coefficients

4.8 Review of the Results

The results of the SEM analysis suggest that all three hypotheses (H1: *Perceived enjoyment has direct positive effect on attitude,* H2: *Perceived enjoyment has direct positive effect on behavioral intention, and* H3**:** *Attitude has direct positive effect on behavioral intention)* were supported. Overall, the model explained 90% of the variance of behavioral intention. Moreover, the model was able to account for 75% of the variance of attitude. The path coefficient from effect of enjoyment, as hypothesized, to attitude was very strong, 0.868 and directly to behavioral intention 0.476. Moreover, the indirect effect of perceived enjoyment on behavioral intention was strong and significant 0.439 (t=7.481). The total effect of enjoyment on behavioral intention was 0.915 (t=63.603). Because the path from perceived enjoyment to behavioral intention is not zero and both links perceived enjoyment to attitude, and link from attitude to behavioral intention are not

zeros either, attitude is a partial mediator between perceived enjoyment and behavioral intention (A. Wu & Zumbo, 2008). This finding indicates that attitude partially mediated the effect of enjoyment on behavioral intention. The path coefficient from attitude to behavioral intention was 0.505 (t=7.549). The effects of perceived enjoyment and attitude are presented in TABLE 16.

TABLE 16 Effects of perceived enjoyment and attitude on BI and ATT

	on ATT	on BI	total indirect on BI
PE	0.868 (t=47.715)	0.476 (t=7.7567)	0.439 (t=7.481)
ATT	N/A	0.505 (t=7.549)	N/A

4.9 Summary

In this chapter the data descriptive, measurement model analysis, estimation of individual measurement model, reliability and validity review of the constructs, analysis of common method variance, estimation of the whole measurement model, SEM analysis and review of the results were introduced. Data descriptive revealed that most of the respondents were men having a share of 91.4 % whereas women had a share of 8.6 %. The mean age of respondents was 40.9 years and median age was 40 years. The measurement model was analysed using confirmatory factor analysis. Then individual models of the constructs were estimated and some minor changes were made to them. Then validity and reliability of the constructs of the measurement model was assessed. It was found out that the model fulfils the validity and reliability requirements. The worry of common method variance was eliminated from data using Harman one factor analysis. Then the whole measurement model was estimated and SEM analysis was made with the model. It was   found out that all three hypotheses can be accepted based on the estimation results of the study.

In the next chapter the results of the current study are discussed, contributions for the academy and practitioners are assessed and finally some guidelines for future work are proposed.

5   CONCLUDING DISCUSSION

In this chapter the key findings and results of the study are discussed first. Then the limitations of the study are introduced followed by contribution of it. Finally some suggestions for future studies are proposed based on the findings in the study.

5.1   Discussion on Key Findings and Results

The research problems of the current study were:

1. Is attitude a reliable predictor of behavioral intention to use technology when the use is mandatory?
2. Is enjoyment an antecedent of attitude and behavioral intention to use technology when the use is or mandatory?

They were addressed using the following three hypotheses: *H1: Perceived enjoyment has direct positive effect on attitude, H2: Perceived enjoyment has direct positive effect on behavioral intention, and H3: Attitude has direct positive effect on behavioral intention.* The results of the SEM analysis suggested that all three hypotheses were supported.

This is a remarkable finding in the area of technology acceptance area in the context when the use is mandatory. In overall, the model explained 90% of the variance of behavioral intention. It can be considered as high. Moreover, the model was able to account for 75% of the variance of attitude.

The original TAM model included attitude as a mediator of usefulness, and ease of use as a mediator of the intention to use. This role of attitude as a partial mediator of enjoyment was supported in the current study. The effect of enjoyment to behavioral intention was strong and significant both directly and indirectly via attitude. Because the path from perceived enjoyment to behavioral intention was not zero, and both links perceived enjoyment to attitude, and link from attitude to behavioral intention were not zeros either, attitude was a

partial mediator between perceived enjoyment and behavioral intention (A. Wu & Zumbo, 2008). This finding indicates that attitude partially mediated the effect of enjoyment on behavioral intention. The path coefficient from attitude to behavioral intention was 0.505 (t=7.549). This indicates a strong and significant relationship between them. Attitude as such has been suggested to be important in mandatory settings as well, but the power of attitude to predict behavioral intention has been questioned (Brown et al., 2002). Brown et al. in their study comparing original TAM, parsimonious TAM (without attitude) and TPB in mandatory context suggested that the effect of attitude on behavioral intention is insignificant. They explained this deviating finding by employees' feelings which do not influence their intention to use system because extrinsic motivation factors play equally important role. The results of the current study do not support the results of Brown et al (2002). On the contrary, the results suggest that the effect of attitude on behavioral intention is strong and significant. Hence, in the light of the results of the current study the first research question *"Is attitude a reliable predictor of behavioral intention to use technology when the use is mandatory?"* can now be answered "yes".

The path coefficient from enjoyment, as hypothesized, to attitude in the current study was very strong, 0.868 and directly to behavioral intention 0.476. Moreover, the indirect effect of perceived enjoyment on behavioral intention was strong and significant 0.439 (t=7.481). The total effect of enjoyment on behavioral intention was 0.915 (t=63.603). This is supported by the findings of Teo et al. in their study in a mandatory context. They proposed that perceived enjoyment is the most dominant determinant of usefulness, ease of use and attitude in mandatory setting (Teo & Noyes, 2011). Teo and Noyes used 153 pre-service teachers showing that enjoyment has a significant effect on core constructs of TAM model. Enjoyment had the largest effect on perceived usefulness, then on perceived ease of use and on behavioral intention to use technology. The findings of the current study, similar to those of Teo et al., is on the contrary to the earlier results (Venkatesh, 2000) suggesting that enjoyment would be affecting on perceived usefulness mainly indirectly via perceived ease of use. In the current study the effect on behavioral intention was both direct and indirect via attitude. Both were strong and significant.

Davis et al. (1992) demonstrated that enjoyment together with usefulness can account for up to 75% of the variance to use computer system in utilitarian context. They were able to show not so strong but significant relationship between enjoyment and behavioral intention (regression of intention (BI) on enjoyment (PE), $\beta_{BI,PE}$ = 0.15, p=0.016). In the light of the study of Davis et al. the result of the current study regarding the relationship between enjoyment and behavioral intention looks much stronger. Moreover, there was also an indirect effect via attitude on behavioral intention which was also strong and significant.

In the light of the results of the current study the second research question *"Is enjoyment an antecedent of attitude and behavioral intention to use technology when the use is or mandatory?"* can be answered "yes".

The results of the meta-analysis of Gerow et al. (2013) suggest that intrinsic motivation factors, like enjoyment, are as important in the context of utilitar-

ian systems, not only that of hedonic systems. The findings of this study support these results. In a summary, the current study supports the newest suggestions in IS research that attitude towards using the information system and perceived enjoyment are important factors in technology acceptance in mandatory setting as well.

5.2   Limitations of the study, Contribution and Future Work

This work is not without its limitations. Firstly, the literature review was not fully systematic fulfilling all requirements of systematic literature review. Secondly, the research framework and the measurement of behavioral intention, attitude and perceived enjoyment were done using the video presentation of the pre-prototype, not using a real information system in operational use. Thirdly, the results were based on a single study only. For deeper view a longitudinal survey would be needed. Fourthly, the gender of respondents was somewhat biased as data was over-presented by opinions of male respondents.

The results of the current study can be utilized in several ways.   They can be used in the future information research by researchers willing to study more technology acceptance in mandatory use. Results help to create more understanding on the intrinsic factors also in that context. In the same way, results help practitioners and developers of information systems to understand those end users' factors which affect on the final end user acceptance of such systems. By knowing constructs like perceived enjoyment they can develop products and services which are, not only to help end users to do their jobs better or more efficiently, but can be enjoyable at the same time as well.

Results of the current study represent the minority of current information system research area. Future work is needed to find similar research result to support the findings, or to find results suggesting falsifying the results of the current study. In the future, the products and services might be done by the same suppliers for utilitarian users and hedonic users. If this trend will come true, there is a need for even deeper understanding of intrinsic motivation in mandatory context.

6 SUMMARY

The current study studied the effects of three latent factors in technology acceptance in mandatory context; behavioral intention, perceived enjoyment and attitude. The study contained both literature review and empirical research to find answers to two research questions: 1) Is attitude a reliable predictor of behavioral intention to use technology when the use is utilitarian or mandatory?, and 2) Is enjoyment an antecedent of attitude and behavioral intention to use technology when the use is utilitarian or mandatory? Literature review was performed. The empirical study was performed with subjects of 267 police officers in field operations. Based on data collected in previous survey, a structural equation modelling (SEM) analysis was performed with latent constructs using the measurement model developed in the beginning of the study. Model contained those three latent factors, behavioral intention, perceived enjoyment and attitude. The results suggested that both research can be answered in the affirmative. Research results indicated that enjoyment is important factor and significant antecedent of attitude and behavioral intention also in the context of utilitarian, mandatory information systems, not only that of hedonic systems. Moreover, results suggested that attitude is a reliable antecedent of behavioral intention in mandatory context. In a summary, the current study supports the newest suggestions in information systems research that attitude towards using the information system and perceived enjoyment are important factors in technology acceptance in mandatory setting as well.

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APPENDIX 1

Measurement scales for enjoyment, attitude and behavioral intention

Behavioural Intention (BI)

BI1	I would intend to use the system in my daily work as often as needed.
BI2	Whenever possible, I would intend to use the system in my daily job.
BI3	I would estimate that my chances of using the system in my daily job are frequent.

Perceived Enjoyment (PE)

PE1	I find using the system to be enjoyable.
PE2	The actual process of using the system is pleasant.
PE3	I have fun using the system.

Attitude (ATT)

All things considered, using the system will be a

ATT1	bad idea….good idea
ATT2	foolish move…wise move
ATT3	negative step…positive step
ATT4	ineffective idea…effective idea