The Effect of Age on Technology Acceptance among Field Police Officers

Erkki Kurkinen
University of Jyväskylä
erkki.l.kurkinen@jyu.fi

ABSTRACT

This paper studies the differences on technology acceptance between two age groups among uniform police forces. The goal was to seek more understanding on the effects of age on technology adaption in the context of mandatory technology use. Data was collected from police officers in field operations. User intentions were measured after subjects had seen a presentation of a pre-prototype of a mobile information system on the video. The results of this study suggest that there is no difference between the old and young age groups. Similarly, the results suggest that the effect of age is similar between the age groups on the effects of the factors in the research model. This suggests that the old police officers are similar to young police officers regarding the acceptance of new technology for their use. The most prominent result was that regression of behavioral intention on perceived usefulness was not statistically important.

Keywords

Technology acceptance, non-volitional use, police officer

INTRODUCTION

The Finnish police, like many other police forces, are planning to transfer most of the patrol communication and information and communication technology (ICT) activities in the field operations to mobile devices in the forthcoming years. This change is planned to be performed as an extension of the enormous ICT –project of the police. As the mobile devices and mobile applications will play a major role in the future police field operations in Finland, the user acceptance of this type of applications is becoming increasingly important. In order to better understand factors which may affect the user acceptance among police it is valuable to make studies in this field.

The Finnish police plan to raise the retirement age of police officers in the field operations three years from the current 60 years to 63 years (STTK 2012). As the police simultaneously are planning to utilize new technology in large scale in the future, this dilemma offers an opportunity for researchers. This paper aims to cover one part of this research by studying the effect of age of a police officer on technology acceptance.

This paper views the technology acceptance via the lens of the technology acceptance model (TAM) (Davis 1989) supported by the suggestion of the prototype user acceptance testing (Davis 2004). TAM posits that a person's own use of technology depends on his or her intentions. In this paper the determinants of the intentions are the original TAM determinants, namely perceived ease of use (PEOU) and perceived usefulness (PU). Davis has shown (Davis 2004) that measures of user intentions and perceived usefulness which are based on using a prototype instead of a real working system are predictors of those which would be found using a real system after the implementation. This finding offers a good opportunity to measure user intentions before the costly implementation of the information system.

The increasing retirement age of the police officers may affect the utilization of new technology among elderly police users. Normally, it has been expected that older people are less willing to utilize new technology than young people. Some psychological research results suggest that older people in work are more likely to conform to the opinions of their colleagues and have lower need for autonomy (Evans, Kiggundu & House 1979). However, regarding the effect of age in technology adoption the results from prior research are not apparent. It has been proposed (Burton-Jones & Hubona 2006) that age has significant effect on perceived ease of use (in the context of word processing) but had no effect on perceived ease of use and perceived usefulness (in email context). Similarly, age seems to have more effects on technology acceptance more than other factors do (Sun & ang 2006). The effect of age also seems to vary between different factors in TAM model (Ibid.) On the other hand, it has been suggested (Gomez, Egan & Bowers 1986; Nickell & Pinto 1986) that there is a strong relationship between age and the use of information technology.

GOAL OF THE STUDY AND RESEARCH QUESTIONS

The goal of the current study is to seek more comprehension of the effects of age of the user on technology adaption when the use of technology is mandatory. Based on the deductions in prior research and on the reasoning presented above to seek a resolution in the police context the following hypotheses are proposed:

H1: Age has a direct negative effect on the intention to use mobile technology in police field operations.

H2: Age has a direct negative effect on perceived ease of use.

H3: Age has a direct negative effect on perceived usefulness.

TAM posits that the use of new technology can be predicted by the behavioral intention of the user. This behavioral intention, in turn, has perceived usefulness and perceived ease of use as its determinants. Moreover, perceived ease of use is determinant of perceived usefulness in TAM. Hence, there are three constructs in TAM; perceived ease of use, perceived usefulness and behavioral intention. In summary, perceived ease of use has an effect to perceived usefulness but also has a direct effect to behavioral intention. According TAM, perceived usefulness has a direct effect to behavioral intention. These effects of the constructs to each other may change with age in the police context. These affects can be understood as moderators on the effects as well. Hence, the following hypotheses are proposed:

H4: Age has a direct negative effect on the effect of perceived ease of use on perceived usefulness.

H5: Age has a direct negative effect on the effect of perceived ease of use on behavioral intention.

H6: Age has a direct negative effect on the effect of perceived usefulness on behavioral intention.

METHODOLOGY

The use of prototypes in user acceptance testing of information systems (Davis 2004) is a method used in systematic user acceptance testing without a real working information system. In prototype user acceptance testing a user under test will only see or use a prototype, or will go through a specification of the future system. After that the user's perceptions are measured to find out his or her intentions. In the current research the prototype was shown to users in a 12 minutes video presenting the main features of the mobile police field system. After that the questionnaire was asked to be filled electronically. In the video policemen were using a fictional information system utilizing their smart phones. To make the video more realistic a demonstration of such a system was built for 18 different police applications including, inter alia, transferring digital images from a car crash to the data base, data query from a data base, data storing into a data base, register check of a vehicle, register check of firearms and reporting the working hours into the police management system.

Figure 1 Sample applications in the video

Figure 1 presents two shots from the video showing examples of the applications which were presented to the prior to questionnaire. Subjects watched the video when on duty in their office environment and filled the questionnaire independently according to the written instructions they received via the introductory e-mail containing also the links to the video and questionnaire. Respondents were not instructed in other ways during the session.

RESEARCH MODEL AND OPERATIONALISATION

The research model is depicted in Figure 2. Hypotheses H1, H2, H3, H4, H5 and H6 are presented in the figure as well.

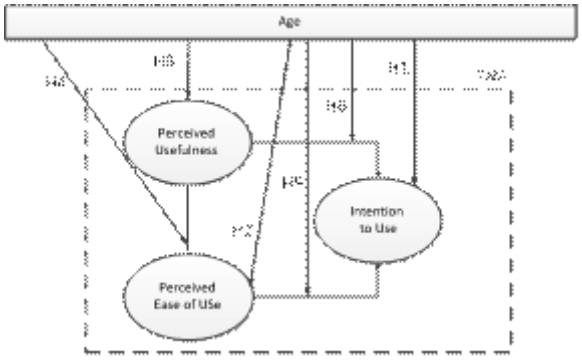

Figure 2 Measurement model

The operationalisation of the constructs was done using pre-validated scales. The selection of the items was based on the principle that all scales for the measurement model must have been validated in some domain, but not necessarily in the police domain. Hence, all items in the models are validated previously in professional non-volitional domains. The selection of the items was based on the knowledge of the research questions, hypotheses of the research and on the knowledge of the domain of the research target population, the Finnish police.

The behavioral intention (BI) construct was operationalised using the scales defined by (Wu, Wang & Lin 2007). The scale consisted of the items BI1, BI2 and BI3. The perceived ease of use (PEOU) and perceived usefulness (PU) constructs were operationalized using the scales defined by (Davis, Bagozzi & Warshaw 1989) and (Davis 2004). These scales consisted of the items PEOU1, PEOU2, PEOU3, PEOU4, PU1, PU2, PU3 and PU4.

The tense of the questionnaire was reformed to the future tense from the original tense as the questionnaire was asking the conceptions of using a technical system that was shown in a short video and would be available in the near future. The measurement scales were the following:

BI1	I intend to use the system in my daily work as often as needed.
BI2	Whenever possible, I intend to use the system in my daily job.
BI3	I estimate that my chances of using the system in my daily job are frequent.
PU1	Using the system improves my performance in my job.
PU2	Using the system in my job increases my productivity.
PU3	Using the system enhances my effectiveness in my job.
PU4	I find the system to be useful in my job.
PEOU1	My interaction with the system is clear and understandable.
PEOU2	Interacting with the system does not require a lot of my mental effort.
PEOU3	I find the system to be easy to use.
PEOU4	I find it easy to get the system to do what I want it to do.

Once the scales were developed they were carefully translated into the Finnish language from the original English versions. These Finish versions were cross-checked with the native Finnish colleagues having research background. After that the questions of the scales were reviewed together with the target police staff. The team of reviewers consisted of four policemen, one female and three male police officers operating daily in field operations. They all were native Finnish language speakers. The aim of the police review was to ensure that the questions are understood by the police and the phrasing of the questions is consistent with the police vocabulary. Some modifications and word changes were made after the police review. After that the construct were put under the sorting procedure to check the construct validity (Moore & Benbasat 1991). The hit ratios ranging from 73% to 85 % showed acceptable level of agreement between the reviewers.

Before launching the questionnaire to pre-testing, the items order was randomized. The questionnaire was pre-tested in the Finnish Police College in Tampere. The respondents were the students of the Police College having working experience in the Finnish Police ranging from 6 months to 15 years. The questionnaire was presented on paper in two sessions in classroom environment. In the sessions there were 37 participants in the first and 39

participants in the other, totaling 76 respondents. In both sessions the subjects were shown first a short video of 12 minutes showing how the future mobile police field system would work. After that they were instructed to fill in the questionnaire. All constructs were presented on 7-scale Likert–type scale. All participants returned the questionnaire. The results of the pilot data collection was acceptable in terms of reliability and convergent and discriminant validity. Based on that assessment, the data collection was performed.

DATA COLLECTION

The data collection was performed in 16 police departments and in National Traffic Police all over the country in Finland in February–March 2012 using electronic data collection system (Webropol 2012) in the police intranet. The data were moved from the data collection system to Excel sheets in order to make the data suitable to be used in Mplus v6.12 software (Muthen & Muthen 2012) and PASW Statistics 18 (PASW Statistics 18, 2012), which were used in the analysis of data.

DATA DESCRIPTIVES

The respondents were mostly men. Their share was 90 %. Men were slightly overrepresented in data as the share of women is ca 13 % among the uniformed Finnish police forces (Finnish National Police Board 2011). Data was analyzed for means, standard deviations, skewness, kurtosis and normality of each item. Data with the missing values was used to calculate descriptive statistics values.

The results reveal that the means of all items measuring behavioral intention is below 3 in Likert 7-poine scale. This means that respondents saw that they most probably would not intend to use the system which was shown in the video. However, they considered that most probably the system would be useful and easy to use as the scores were over 3 in all items measuring usefulness and ease of use.

The skewness and kurtosis indexes revealed that data would be non-normally distributed. The normality of the items was tested with Kolmogorov-Smirnov one sample test in PASW. All the items were non-normally distributed. Normally, statistical analyses assume that parameters are normally distributed. However, in contemporary statistical software tools there are estimators available to handle non-normally distributed parameters as well. For this reason the MLM estimator in Mplus software was used.

In order to see the same values for the young and old respondents, respondents were split into two groups using the mean age of the subjects (42 years) ; group "young" having age $\leq$ 42 and groups "old" having age > 42 years. The mean age in the group "young" was 33.7 years and in the group "old" it was 50.4 years.

Based on the comparison between the mean values of the questionnaire items for these two groups, it seems that the difference exists between these two groups, especially in perceived usefulness where the means are slightly higher in the young group than in old group. However, regarding the behavioral intention and perceived ease of use, the difference is just opposite; the means of the items are slightly higher in old group than in young group.

STRUCTURAL EQUATION MODELING (SEM) AND GROUP COMPARISON

Estimation of the Measurement Model (TAM)

The data with imputed values was used in the analysis. The imputation of data was done in PASW statistics 18 software using Markov Chain Monte Carlo (MCMC) method. The estimations of the constructs of the measurement model indicated good fit with data. The estimation was done separately for each construct of TAM; PU, PEOU and BI. The correlations between the latent variables were found to be high.

Estimation of the SEM Model

The analysis of the relationships between the constructs of the model was based on use of the structural equation modeling (SEM) of the TAM measurement model. The estimation of the SEM model was accomplished using Mplus v6.12 software (Muthen & Muthen 2012). The robust MLR - estimator was used in Mplus because of non-normality of data. The SEM model, based on the TAM model depicted in Figure 2, included three latent constructs having 11 measuring items. Latent constructs were behavioral intention (BI), perceived usefulness (PU) and perceived ease of use (PEOU).

The initial model having all 11 items in 3 all constructs was rejected (χ^2 (41)=148.389, p < 0.05). The biggest modification index (61.663) indicated that the model could be improved by letting PU4 to measure BI. The second biggest modification index (41.168) suggested that PU4 would have been measuring PEOU. It was suspected that PU4 is measuring not only PU but is tapping PEOU and BI as well. This was also confirmed in CFA which was done with three factor model with MPlus. CFA also rejected three factor model (χ^2 (25)=45.626, p < 0.05). For this reason it was decided that PU4 will be removed from the scale of PU. This modification can be justified, because there are still three items left measuring PU. It was decided to implement this modification into the model.

The new estimation was done now with PU4 removed. The model was still rejected (χ2 (32) = 72.623, p=0.000). This was also confirmed in CFA which done with three factor model with PU4 removed (χ2(18)=31.087, p=0.0215). Now the biggest reasonable modification index (19.141) proposed that the model could be improved if PEOU2 would measure PU. Similar to item PU4, it was suspected that PEOU2 would measure not only PEOU but PU as well. It was decided that the item PEOU2 is removed from the PEOU construct. The new EFA was also run with PEOU2 removed. Now the three factor model was accepted (χ2 (12)=15.749, p=0.2030). After that a new estimation of the model was done. Now the model fit showed a very good fit with data (χ2 (24)=25.485, p > 0.05). There were no modification indices that would have been reasonable to be implemented. The fit indices for the final model are presented below (Table 1).

Fit index	**Value**	**Recommended value**
χ2	25.485	N/A
Df	24	N/A
P	0.4964	> 0.05
RMSEA	0.016	< 0.08
CFI	0.999	> 0.95
TLI	0.999	>0.95
SRMR	0.017	<0.05

Table 1 Model evaluation overall fit

The results showed that the model had a good fit with data. χ2 -test indicated that the model was adequate (χ2(24)=25.485, p > 0.05). Root mean square error of approximation (RMSEA) was 0.016 and the 90 % CI was (0.000 – 0.056). The values of CFI (0.999), TLI (0.999) and SRMR (0.017) supported the indication of a good fit of the model to the data. The estimated composite model for all subjects with factor loadings, errors and coefficient of determination (R- squared) values is depicted in Figure 3. The estimation of the model revealed that all parameters were significant except the regression of behavioral intention on perceived usefulness.

Comparison of Groups

The analysis of the data was done using multiple group analysis functionality of Mplus software. For the comparison the subjects were divided into two groups using the estimated mean of the subject, 42 years. Subjects having the mean below 42 years (N = 121) were called “young” and subjects having the mean above 42 (N = 119) years were called “old”.

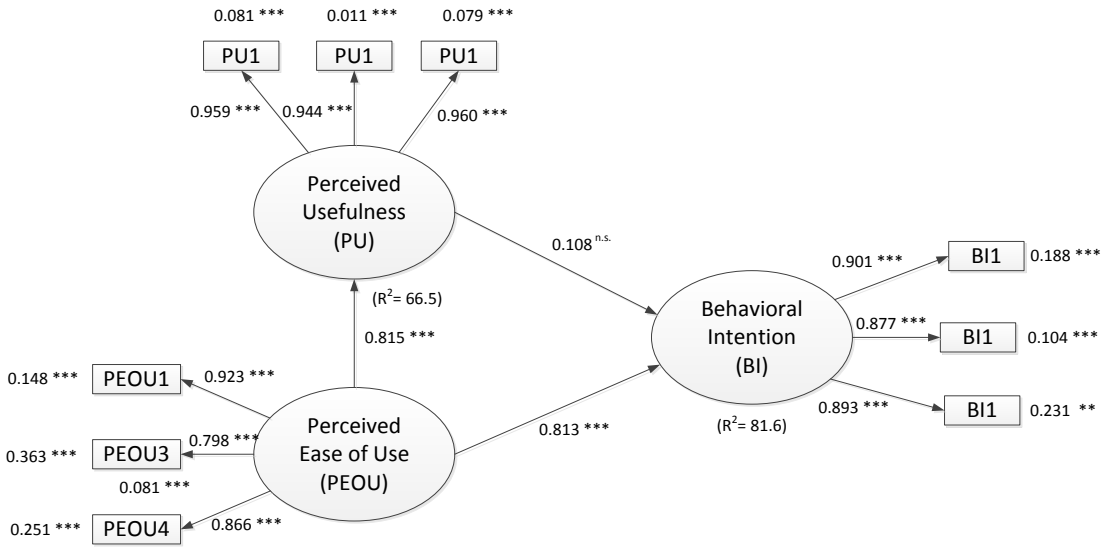

Figure 3 Estimated TAM model (standardized values, * = p < 0.05, ** = p < 0.01, *** = p < 0.001)

RESULTS

Comparison of groups

When the model was adequate the next step was to study the difference between the two groups; young and old. This comparison was done using multiple group analysis of the SEM model. The method is widely referred in the literature (Chen, Sousa & West 2005; Cheung & Lau 2012; Dimiter 2006; Lubke et al. 2003; Meredith 1993; Muthen & Muthen 2012; Sass 2011; Steenkamp & Baumgartner 1998). The idea is to test the measurement invariance between the groups starting from the baseline model and then gradually proceed step by step towards more restrictive models ensuring the measurement invariance in every step. Finally the equality of the means and progression coefficients can be tested. χ2-difference test is performed in every step to test the deterioration of the model fit. In the baseline model all the groups are present in the same model where the form invariance is shown both for the all samples and separately for each group as well. Form invariance indicates that the constructs have the same meaning for each group (Dimiter 2006). Measurement invariance indicates that the scores of the constructs have the same meaning each group. The measurement invariance testing procedure in this paper is adapted from (Muthen & Muthen 2012)) added with variance invariance testing. The following measurement procedure for measurement invariance testing is used. The models are listed from the least restrictive to the most restrictive. The name of the model used in this paper is indicated in the parenthesis.Creating the baseline model: intercepts, factor loadings, and residual variances free across groups; factor means fixed at zero in both groups (= Baseline model)

1. Testing the measurement invariance of factor loadings: loadings constrained to be equal across groups; intercepts and residual variances free; factor means fixed at zero in both groups (Model 1)
2. Testing of measurement invariance of factor loadings and residual variances of endogenous variables: factor loadings and residual variances of endogenous variables are set equal in both groups; intercepts and residual variances are free; factor means fixed at zero in both groups (Model 2)
3. Testing of measurement invariance of factor intercepts: factor loadings, intercepts are set equal in both group (Model 3)
4. Testing the construct means: factor loadings, intercepts and factor means are set equal in both groups (Model 3B)
5. Testing of measurement of invariance of regression coefficients: intercepts, factors loadings and regression coefficients constrained to be equal across groups; residual variances free; factor means zero in one group and free in the others (Model 4)

The deterioration of the model in nested, sequential tests can be done using $\chi 2$-difference test. In this paper the MLR –estimation is used in Mplus and therefore $\chi 2$-difference test could not be used directly, but the Satorra–Bentler scaling had to be used. The Satorra-Bentler $\Delta\chi 2$-test values were calculated from Mplus $\chi 2$-values, using the scaling correction values (Muthen & Muthen 2012). Then, the $\Delta\chi 2$ differences were used in model comparisons.

The procedure began with the estimation of the TAM model (Figure 2) that was presented in this paper, separately for both groups. For the group "young" (N=121) the model fitted very well ($\chi 2(24)= 23.398$, p=0.0.4964, scaling correction factor= 1.098, RMSEA= 0.000 CFI= 1.000, TLI= 1.000, SRMR= 0.021). For the group "old" (N=121) the model fitted very well ($\chi 2$ (24)= 27.674, p= 0.2740, scaling correction factor= 1.301, RMSEA= 0.036 CFI= 0.996, TLI= 0.994, SRMR=0.020). These results indicated the form invariance meaning that the constructs were the same for both groups. It was found out that the regression of perceived usefulness on behavioral intention was not statistically significant.

Estimating baseline model for group analysis (Baseline)

The procedure proceeded to the forming of the baseline model for two groups. The intercepts, factor loadings, and residual variances were set free across groups and factor means were fixed at zero in all groups. The estimation of the baseline model for two groups indicated a very good fit of the model with data ($\chi^2(48)=$ 51.434, p= 0.3408, scaling correction factor= 1.199, RMSEA= 0.024, CFI= 0.998, TLI= 0.997, SRMR= 0.021). This model is called a baseline model in this paper.

Measurement invariance of factor loadings (Model1)

The following model that was estimated was more restricted model, Model 1, where factor loadings were constrained to be equal across groups, intercepts and residual variances were free and factor means fixed at zero in all groups. The resulting model fitted to the data very well ($\chi^2(54)=$ 53.116, p= 0.5085, scaling correction factor= 1.211, RMSEA= 0.000, CFI= 1.000, TLI= 1.001, SRMR= 0.027). The calculated $\Delta\ \chi^2$-difference value between the Model 1 and Baseline model ($\Delta\chi^2=$ 2.114, Δdf= 6) suggested no statistically significant deterioration between the model 1 and the baseline model. Based on this the hypothesis of the equal factor loadings between the groups was accepted.

Measurement invariance of residual variances (Model2)

Then the Model 2 was estimated for testing the measurement invariance of the residual variances of the endogenous variables PU and BI. In Model 2, the factor loadings and variances were set equal in both groups, intercepts and residual variances were free; factor means were fixed at zero in both groups. The resulting model model 2 fitted to the data very well (χ^2 (57)= 59.158, p= 0.3391, scaling correction factor= 1.341, RMSEA= 0.018, CFI= 0.999, TLI= 0.998, SRMR= 0.081). The calculated $\Delta\ \chi^2$ -difference value between model 2 and model 1 ($\Delta\ \chi^2 = 7.287$, Δdf = 3) suggested no statistically significant deterioration between model 1 and model 2. Based on this the hypothesis of the measurement invariance of variances between the groups was accepted.

Measurement invariance of factor loadings and intercepts (Model3)

Next the model 3 was estimated for factor loadings and intercept invariance testing. In model 3, the factor loadings and intercepts were set equal in both groups. The resulting model model 3 fitted to the data very well (χ^2 (60)= 61.726, p= 0.4142, scaling correction factor= 1.190, RMSEA= 0.015, CFI= 0.999, TLI= 0.999, SRMR = 0.030). The calculated $\Delta\ X^2$ -difference value between model 3 and model 1 ($\Delta\ \chi^2 = 9.121$, Δdf= 6) suggested no statistically significant deterioration between model 3 and model 1. Based on this the hypothesis of the measurement invariance of the factor loadings and intercepts between the groups was accepted.

Comparing group means (Model 3B)

The factor means can be compared when the invariance of factor loadings and intercepts is in place (Dimiter 2006). Hence, the difference in means between the two groups, young and old, could be detected from the results of the Model 3. In Model 3 the construct means are set to zero in the reference group, which was the "young" group. The construct means are released in the "old" group. In the estimation the difference between the means of the constructs equals the mean of the non-reference group. Hence, the difference and sign can be detected. It could be seen that there were differences in means of PEOU and BI between young and old, but

none of them were statistically significant (PU= 0.284, p > 0.05; PEOU = -0.041, p > 0.05, BI = - 0.088, p > 0.05).

This equality of group means was also verified with estimating Model 3b where factor loadings and intercepts were set equal and means were set to zero on both groups. The resulting model, model 3b fitted to the data very well (χ^2 (63)= 67.488, p= 0.3264, scaling correction factor= 1.183, RMSEA= 0.024, CFI= 0.997, TLI= 0.997, SRMR =0.039). The calculated $\Delta\chi^2$-difference value between Model 3B and Model 3 ($\Delta\chi^2$= 6.121, Δdf= 3) suggested no statistically significant deterioration between model 3b and model 3. Hence, hypotheses H1, H2 and H3 were not supported.

Comparing regression coefficients (Model 4)

In order to test the invariance of regression coefficients, the Model 4 was formed. In model 4, in addition to factors loadings, intercepts and factor means also regression coefficients were constrained to be equal across both groups. The residual variances were left free. The regression of behavioral intention on perceived usefulness was not interesting as it was shown as not statistically significant in the estimation of the model. For this reason that regression was left out in the model. The resulting model, model 4, fitted to the data very well (χ^2(65)= 67.300, p= 0.3983, scaling correction factor= 1.187, RMSEA= 0.017, CFI= 0.999, TLI= 0.998, SRMR = 0.037). The calculated $\Delta\chi^2$ -difference value between model 4 and model 3 ($\Delta\chi^2$ = 5.587, Δdf = 5) suggested no statistically significant deterioration between Model 4 and Model 3.

Based on these results, the hypothesis of the measurement invariance of the regression coefficients between the groups was accepted. Hence, the regression of perceived usefulness on perceived ease of use and the regression of behavioral intention on ease of use are equal and hence the hypotheses H4 and H5 were not supported.

It was found out that the regression of behavioral intention on perceived usefulness was not statistically significant and hypothesis H6 was not tested.

As a whole, the model explained 78.5 % of the variance of behavioral intention in the young group and 82.3 % of the variance of behavioral intention in the old group.

The summary of the results of the measurement invariance is presented in Table 2.

Model	χ2	df	Scaling correction factor	p	CFI	TLI	RMSEA	$\Delta\chi$2	Δ df
Baseline	51.434	48	1.199	0.3408	0.998	0.997	0.024	-	-
Model 1	53.116	54	1.211	0.5085	1.000	1.001	0.000	2.114	6
Model 2	60.849	57	1.233	0.3391	0.999	0.998	0.018	7.287	3
Model 3	61.726	60	1.190	0.4142	0.999	0.999	0.015	9.121	6
Model 3b	67.488	63	1.183	0.3264	0.997	0.997	0.027	6.121	3
Model 4	67.300	65	1.187	0.3983	0.999	0.999	0.015	5.587	5

Table 2 Summary of χ^2 –tests between two age groups

The summary of the construct means (α) and regression coefficients (β) and coefficients of determination (R2) is presented in Table 3.

Group	α_{BU}	α_{PEOU}	α_{BI}	$\beta_{PU,PEOU}$	$B_{BI,PEOU}$	$\beta_{BI,PU}$	R^2
Young	0.000 [c]	0.000 [c]	0.000 [c]	0.958 ***	0.767***	0.079 ns	78.5 %
Old	0.284 ns	- 0.041 ns	-0.088 ns				82.3 %

Table 3 Construct means (α), regression coefficients (β) and coefficients of determination (R^2)
(* = p <0.05, ** = p < 0.01, *** = p<0.001), ns= not significant c= fixed to zero)

DISCUSSION AND CONCLUSIONS

In this paper the differences on technology acceptance between two age groups were studied among uniform police forces. The results of the analyses in this study suggest that there is no difference between these two age groups. Similarly, the results suggest that the regression coefficients are equal between the same age groups. This suggests that the "old" police officers are similar to "young" police officers regarding the acceptance of new technology for their use. This finding may give more support to the proposals suggesting that also the police activities could be carried out using mobile information systems in field operations.

The most prominent result was that regression of behavioral intention on perceived usefulness was not statistically important as this is one of the most important traits in TAM.

Data was tested also for clustering. It was suspected that clustering may be present in data caused by the structure of the police departments in different locations. The structures and organizations are in practice similar in all locations. The intraclass correlation coefficient (ICC) is a statistical measure which can be used to detect if there is clustering in data (Muthen & Muthen 2012). ICC was estimated as a function of all parameters having the location of the police department as a clustering variable. There were no significant ICC values; they ranged from 0.046 (with PEOU3) to 0.082 (with PEOU1). If compared to the suggested limit for the ICC (0.100) the results were suggesting that there was no intraclass correlation between the respondents suggesting that there is no clustering in data.

LIMITATIONS OF THE STUDY

The current study is not without its limitations. Firstly, the research was done using a future system shown on the video, not using a real working information system. This may have had its influence on the achieved results. Secondly, the actual usage was not measured but the intention to use instead. Even though the intention is a reliable predictor of the usage, measuring the user conceptions after or during actual use may have resulted to another type of results. Thirdly, the self directed questionnaire which was used instead of the real measurement of the actual use may also have influenced on the results achieved.

ACKNOWLEDGEMENTS

The author acknowledges the financial support of Jyväskylä Doctoral Program in Computing and Mathematical Sciences (COMAS).

REFERENCES

1. Burton-Jones, A. & Hubona, G. S. 2006. The mediation of external variables in the technology acceptance model. Information & Management 43 (6), 706-717.
2. Chen, F. F., Sousa, K. H. & West, S. G. 2005. Teacher's Corner: Testing Measurement Invariance of Second-Order Factor Models. Structural Equation Modeling: A Multidisciplinary Journal 12 (3), 471-492.
3. Cheung, G. W. & Lau, R. S. 2012. A Direct Comparison Approach for Testing Measurement Invariance. Organizational Research Methods 15 (2), 167-198.
4. Davis, F. D. 2004. Toward preprototype user acceptance testing of new information systems: Implications for software project management. IEEE Transactions on Engineering Management 51 (1), 31-46.
5. Davis, F. D. 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly 13 (3), pp. 319-340.
6. Davis, F. D., Bagozzi, R. P. & Warshaw, P. R. 1989. User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. Management Science 35 (8), pp. 982-1003.
7. Dimiter, M. D. 2006. Comparing groups on latent variables: A structural equation modeling approach. Work: A Journal of Prevention, Assessment and Rehabilitation (4), 429-436.
8. Evans, M. G., Kiggundu, M. N. & House, R. J. 1979. A partial test and extension of the job characteristics model of motivation. Organizational Behavior and Human Performance 24 (3), 354-381.
9. Finnish National Police Board 2011. Annual report 2010.
10. Gomez, L. M., Egan, D. E. & Bowers, C. 1986. Learning to Use a Text Editor: Some Learner Characteristics ThatPredict Success. Human–Computer Interaction 2 (1), 1-23.

11. Grewal, R., Cote, J. A. & Baumgartner, H. 2004. Multicollinearity and Measurement Error in Structural Equation Models: Implications for Theory Testing. Marketing Science 23 (4), pp. 519-529.
12. Lubke, G. H., Dolan, C. V., Kelderman, H. & Mellenbergh, G. J. 2003. On the relationship between sources of within- and between-group differences and measurement invariance in the common factor model. Intelligence 31 (6), 543-566.
13. Meredith, W. 1993. Measurement invariance, factor analysis and factorial invariance. Springer New York.
14. Moore, G. C. & Benbasat, I. 1991. Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. Information Systems Research 2 (3), 192-222.
15. Muthen, L.K. & Muthen, B.O. 2012. Mplus 6.12 statistical software. Available in: www.statmodel.com. Accessed: 9. February 2012.
16. Nickell, G. S. & Pinto, J. N. 1986. The computer attitude scale. Computers in Human Behavior 2 (4), 301-306.
17. Sass, D. A. 2011. Testing Measurement Invariance and Comparing Latent Factor Means Within a Confirmatory Factor Analysis Framework. Journal of Psychoeducational Assessment 29 (4), 347-363.
18. STTK 2012. Poliisi tyrmäävät eläkeiän noston. Available in: http://www.sttk.fi/fi-fi/uutiset/uutinen/uutiset-2012/poliisit-tyrmaavat-elakeian-noston. Accessed: 27. MArch 2012.
19. Sun, H. & Zhang, P. 2006. The role of moderating factors in user technology acceptance. International Journal of Human-Computer Studies 64 (2), 53-78.
20. Webropol 2012. Webropol web site. Available in: http://w3.webropol.com/finland. Accessed: 2. February 2012.
21. Wu, J., Wang, S. & Lin, L. 2007. Mobile computing acceptance factors in the healthcare industry: A structural equation model. International journal of medical informatics 76 (1), 66-77.