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Physicians' Behavior Intentions Regarding a Mobile Medical Information System: An Exploratory Study

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ABSTRACT

This study aims to explore the acceptance of technology by physicians by studying their behavior intentions regarding a mobile medical information system. Synthesized from previous information system adoption research, mainly TAM, the UTAUT and personal innovativeness in the domain of IT (PIIT), a research model is proposed and empirically examined, using data collected from 121 physicians working in the healthcare sector in Finland. Results suggest that our proposed model could explain about 74% of the variance in physicians' intentions to use the mobile system. PIIT and age are important moderators influencing the strength of perceived usefulness, ease of use and social influence on behavior intention significantly, but not compatibility. In early exposure to the mobile system, interaction between PIIT and age, ease of use, and social influence are important determinant beliefs challenging the dominant effect on intention of perceived usefulness. Gender and hands-on experience of the system have only an indirect effect through internal beliefs of the system on behavior intention. The findings and implications are discussed.

Keywords

Adoption of mobile information technology, physicians, mobile medical information system, behavior intentions

INTRODUCTION

It is important to study how individuals accept new technology such as a mobile information system designed to support or enhance knowledge workers' daily practice in general, or professionals' performance in particular.

Healthcare organizations have generally been slow to adopt information technology. One possible explanation is that physicians are seldom at their desks and thus cannot use traditional desktop computers. Therefore mobile solutions must be sought to handle information (Stammer 2001). Goldberg and Wickramasinghe (2003) argue that mobile e-health services offer a solution to healthcare problems in the 21st century. However, the success of these mobile e-health services depends to a large extent on how physicians are prepared to use them into their daily work.

This paper reports an exploratory study on technology acceptance by physicians' regarding their behavior intentions to accept a mobile medical information system. In the next section, we briefly review the relevant technology acceptance literature. The research model and research hypotheses are then described. The methodology issue is followed by a review of our measuring instruments and our study context. The next section presents the important results found in the study. The paper ends with a summary of the study's findings and its implications.

THEORETICAL BACKGROUND AND RESEARCH HYPOTHESES

Theoretical Background

The Technology Acceptance Model (TAM) is tailored to study user acceptance of computer technology. According to TAM, behavior intention (BI) is a major determinant of usage behavior; behavior can be predicted by measuring BI. BI is viewed as being determined by how a person considers the perceived usefulness (PU) and ease of use (EU) of systems under investigation. “*PU and EU are postulated a priori, and are meant to be fairly general determinants of user acceptance*” (Davis, Bagozzi and Warshaw, 1989). TAM emphasizes the importance of how external variables, e.g. various individual differences, situational constraints, organizational characteristics and system characteristics etc. affect the individual internal decision process.

Venkatesh, Morris, Davis and Davis (2003) proposed a unified model, the Unified Theory of Acceptance and Use of Technology (UTAUT), based on studies of eight prominent models in IS adoption research. UTAUT is formulated with four core determinants of intentions and usage: performance expectancy, effort expectancy, social influence and facilitating conditions, together with four moderators of key relationship: gender, age, experience and voluntariness of use. The model was empirically examined and found to outperform the eight individual models (adjusted $R^2 = 0.69$), including TAM. According to UTAUT, examination of the effects of the four moderators has contributed to a better understanding of the complexities of technology acceptance by individuals. Because of its outstandingly strong theoretical premises and explanatory power, this model gives us greater insights into the individual's adoption of an information system, especially the role played by important moderators in the key relationships between beliefs and behavioral intentions.

Personal Innovativeness in the domain of Information Technology (PIIT) is also an important moderator in the development of behavioral intentions towards technologies. PIIT is a measure of the willingness of an individual to try out an IT innovation. Two studies by Agarwal and Prasad (1998a, 1998b) have proved that PIIT might serve as a key moderator for the antecedents as well as the consequences of perceptions. That is, PIIT might moderate the relationships between perceptions - perceived usefulness, ease of use, compatibility - and the adopter's decision to accept an innovation.

A number of researchers have studied user acceptance of mobile technology and services such as the mobile Internet, text messaging, contact services, mobile payment, mobile gaming and mobile parking services based on IS adoption models (e.g. Pedersen, 2002; Pedersen and Nysveen, 2003; Pedersen, Nysveen and Thorbjørnsen, 2003). They found that usefulness and ease of use are very important factors determining user acceptance of mobile technology. The results of these studies confirm that in the mobile technology context, the traditional adoption models such as TAM could be applied, but need modification and extension in order to increase their prediction and explanation power.

Research Model and Research Hypotheses

Figure 1 depicts the research model employed in the study. We used behavior intention, not actual usage, as the dependent variable, since the TAM asserts that intention is a proper proxy to examine and predict a user's behavior regarding information systems (Davis et al., 1989). In this study, behavior intention refers to a physician's intention to use a mobile medical information system in his practice in the future. Behavior intention is predicted by four determinants - perceived usefulness (PU), perceived ease of use (EU), social influence (SI), and compatibility (COMP) - with two moderators - personal innovativeness (PIIT) and age. Gender and hands-on experience of the system are conceptualized as external variables that influence behavior intention directly and indirectly through the four key determinants.

Moderation effects

In the study, perceived usefulness (PU) refers to a physician's belief that using the mobile system will help him or her to improve performance in patient care and management. According to TAM, perceived usefulness is positively associated with behavior intention. It is the dominant determinant of technology acceptance by individuals. A single factor determines a physician's adoption of telemedicine technology (Chau and Hu 2002a, b).

Ease of use, the second key determinant of intention, refers to a physician's belief that using the mobile system will be free of effort. In a professional context, ease of use might not have a significant effect on behavioral intentions (Chau and Hu 2002a; 2002b). In our study context, however, a mobile system was introduced into physicians' work practice as a trial. Perceived ease of use might still have fundamental influence on intention. Its effects might be weaker when users are exposed to the system for a relatively long period.

The third user perception examined here, social influence, refers to the degree to which a physician perceives that other people, i.e. peers, colleagues, and family members, etc. think he or she should use the mobile system. Physicians have

exerted considerable influence over managers and patients, which makes the opinions of other important actors increasingly important. Understandably, physicians might adjust their behavioral intention with regard to using new technology by considering those opinions.

Compatibility refers to the degree to which adopting the mobile system is compatible with the existing values, needs and practice style or preference of physicians. Physicians' work styles involve high "mobility" (Ammenwerth, Buchauer, Bludau and Haux 2000) and it is likely that a mobile system might be helpful in coping with it. Following this reasoning, the more physicians perceive mobile systems to be compatible with their current work practice, the higher the likelihood those physicians will accept it.

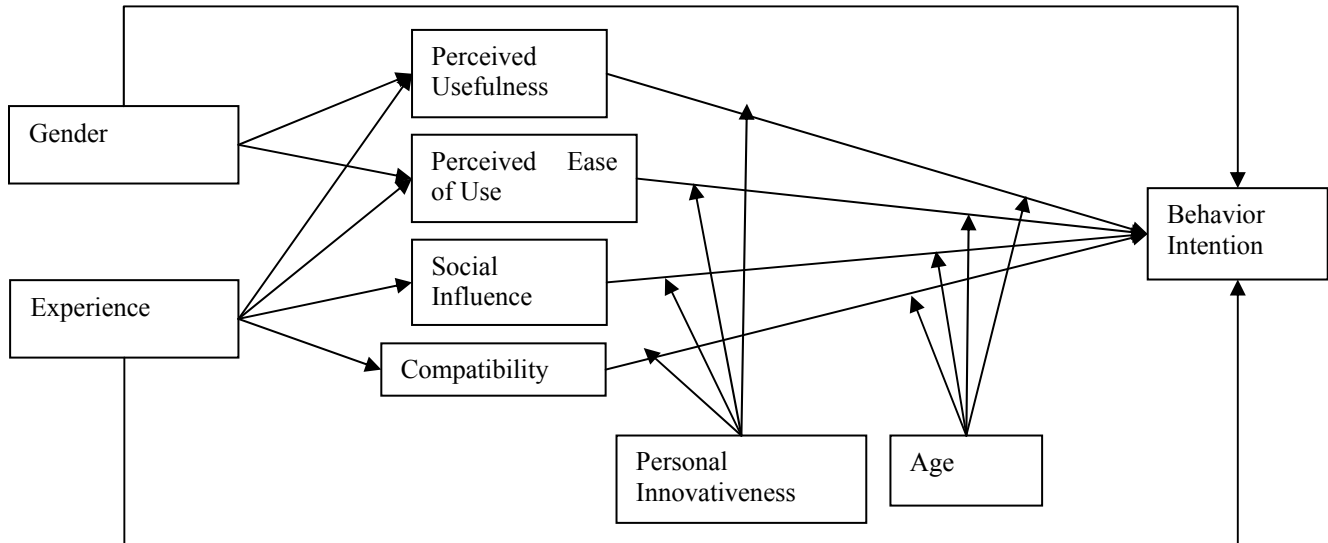


Figure 1. Research Model

Compared with PC-based medical information systems, the mobile system is new and only in the infant stage in the health-care practice. More innovative physicians may be more willing to adopt it and likely to think it is useful for the patient care management in comparison with less innovative ones. Moreover, more innovative physicians might be enthusiastic about using it without concerning themselves too much about the mental effort involved in using the new system. As innovative users, they might be easily persuaded to try the new technology without any heavy arguments. Similarly, innovative users may develop strong intentions to use the new innovation, which may not be compatible with their current work style, or life style. Therefore, PIIT might positively moderate the relationships between perceptions of new mobile innovations and behavior intention. Age is an important variable in the individual adoption of IS. Obviously, younger people are more exposed to mobile technology than the older generation. Therefore, they easily have positive perceptions of the usefulness and ease of use of mobile technology. Furthermore, they might consider a "value-added" mobile system more compatible with their work practice or daily life. Understandably, they are easily encouraged to use new mobile innovations. In contrast, older physicians would regard a mobile system as difficult to use and, consequently, unlikely to be convinced by others.

Taking all those arguments together, we hypothesized the following:

H1: The influence of perceived usefulness on behavior intention will be moderated by personal innovativeness in IT and age; such an interaction effect will be stronger for innovative younger physicians.

H2: The influence of perceived ease of use on behavior intention will be moderated by personal innovativeness in IT and age; such an interaction effect will be stronger for less innovative older physicians.

H3: The influence of social influence on behavior intention will be moderated by personal innovativeness in IT and age; such an interaction effect will be stronger for less innovative older physicians.

H4: The influence of compatibility on behavior intention will be moderated by personal innovativeness in IT and age; such an interaction effect will be stronger for innovative younger physicians.

External Variables

In our design, gender is defined as an external variable that influences physicians' beliefs and behavior intentions. Gefen and Straub (1997) found that women and men differ in their perceptions but not use of e-mail. Gender has significant negative effects on frequency of Internet usage and diversity of Internet usage (Teo, Lim and Lai, 1999). Doll, Hendrickson and Deng (1998) reported that gender does not affect the invariance of the PU instrument, but does affect the EU instrument. Gender plays a vital role in shaping initial and sustained technology adoption decisions by today's knowledge workers (Venkatesh and Morris, 2000). Therefore, the following hypotheses will be tested:

H5.1 Gender will have significant effects on physicians' intention to use the mobile information system in the future, such that women will be less ready to use the system.

H5.2 Gender will not have significant effects on physicians' perceived usefulness of the mobile system.

H5.3: Gender will have significant effects on physicians' perceived ease of use of the mobile system, such that women will rate it higher than men.

Experiences from past or direct usage of IS help in processing informational and social influence perceptions, formulating positive beliefs and performing behavior. For example, it is no surprise that an individual who has general experience of computer technology or specific experience of a particular IS will be more likely to take a positive attitude and intention to use newly introduced or new IS in organizations. Users with a different experiential background differ in their perception of beliefs, e.g. PU toward IS (Doll et al 1998). Empirical studies indicate that experience exerts direct effects on behavior (Taylor and Todd 1995; Tompson, Higgins and Howell, 1994). Accordingly, we tested the following hypotheses:

H6.1: The level of physicians' usage experience of the mobile system will positively affect their behavior intention to use the system.

H6.2: The level of physicians' usage experience of the mobile system will positively affect their perceived usefulness of the system.

H6.3: The level of physicians' usage experience of the mobile system will positively affect their perceived ease of use of the system.

H6.4: The level of physicians' usage experience of the mobile system will positively affect their assessment of the social influence.

H6.5: The level of physicians' usage experience of the mobile system will positively affect their belief in compatibility of the system.

METHODOLOGY

Instrument

Items assessing various constructs were adapted from past research with changes in wording to make them appropriate for the mobile medical information system and the healthcare context. In particular, items on perceived usefulness, ease of use and social influence were adapted from Davis et al., (1989) and Venkatesh et al.,(2003); items such as behavioral intention and items such as compatibility came from Moore and Benbasat (1991) with reference to Teo and Pok (2003), and items of PIIT derived from Agarwal and Prasad (1998a & b). Most constructs were measured using a five-point Likert-type scale, ranging from (1) strongly agree to (5) strongly disagree. Demographic data, e.g. gender, age and hands-on experience of using the system were also recorded.

Study Context

Duodecim Publisher Ltd, a publishing company owned by the Finnish Medical Society Duodecim, designed a mobile medical information system. It is a set of medical information and knowledge databases. It is built on an XML database and can easily be modified to work in most mobile devices with different operating systems e.g., Symbian, Palm OS and Windows CE, etc. In Finland the device most commonly used as a platform is the Nokia 9210 Communicator. Currently the updates are delivered as physical memory cards, the users returning the older ones. In the near future the system will be able to update itself partly or completely through the wireless network. For instance, a new drugs' price list was updated successfully through the GSM network in autumn 2003.

This study was conducted in close co-operation with Duodecim Publisher Ltd. From spring 2003, the Publisher has, with support from Pfizer Finland Oy, started a pilot trial in which 800 physicians were supplied free with Nokia 9210 communicators equipped with the mobile system. The questionnaires for this study were sent out at training sessions organized by the Publishers from November 2003 to January 2004. A total of 350 questionnaires were distributed; 151 were returned and of these 2 had incomplete responses and were excluded from the data analysis. Thus, useful answers totaled 149, showing a 40.3% valuable response rate. Among the respondents, 54.7% were male and 53.1% (N = 147) worked in healthcare centers, 33.1% in hospitals; others worked as private doctors or medical researchers. On average, the responding physicians were 44.8 years old and had over 11 months experience of using the mobile information system. Only 7 physicians had not used the system before. Out of 141 answers, 41 (27.2%) had used the system less than 6 months, 46.8% (that is 66) had used it less than 1 year, and 34 had used it from 1-2 years. Because of missing answers in the variables, only 121 complete responses were used in the multiple regression analysis.

RESULTS

Analysis of Measurement Validity

Measurement validity was evaluated in terms of reliability and construct validity. The reliabilities of the measures using Cronbach's alpha were 0.96 for behavior intention (mean = 3.04, S.D = 1.62), 0.95 for usefulness (mean = 8.34, S.D = 3.82), 0.87 for ease of use (mean = 6.42, S.D = 2.80), 0.81 for social influence (mean = 6.42, S.D = 1.95), 0.89 for compatibility (mean = 4.33, S.D = 1.98), and 0.85 for personal innovativeness (mean = 6.87, S.D = 3.06). The coefficient of these latent variables, are all above the value of 0.70 often recommended in a survey. The construct validity of the instrument was evaluated by computing convergent and discriminant validity using factor analysis. A principal component

Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
PU1	.814	.293	.175	.239	4.346E-02	.107
PU2	.888	.173	9.173E-02	.160	.152	.135
PU3	.870	7.105E-02	.137	.140	.163	.228
PU4	.880	.128	.115	.266	6.001E-02	.149
EU1	.170	.852	.250	.237	-.119	7.783E-02
EU2	.226	.802	.233	7.652E-02	-8.568E-02	.217
EU3	.200	.683	.227	.390	3.068E-02	.274
SI1	.140	-.151	8.379E-02	-4.975E-02	.874	.128
SI2	.115	1.448E-02	3.639E-02	3.004E-02	.923	-2.379E-02
COMP1	.483	.332	.221	.201	4.934E-02	.667
COMP2	.314	.285	.203	.245	.117	.782
PIIT1	.122	.239	.826	7.122E-02	.202	-6.744E-03
PIIT2	.202	.146	.832	.228	-8.365E-02	7.808E-02
PIIT3	.078	.194	.835	-3.079E-02	4.924E-02	.273
BI1	.387	.332	.131	.803	-1.576E-03	.170
BI2	.420	.239	.122	.819	-3.231E-02	.196
Eigenvalues	7.56	2.15	1.76	0.96	0.71	0.62
%of Variance	24.09	15.45	15.26	11.65	11.01	9.08

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Table 1 Results of Factor Analysis

with a varimax rotation was performed. Table 1 summarizes the factor analysis results. Six factors were obtained with eigenvalues greater than 0.50 (Chau and Hu, 2002b). The convergent validity is therefore satisfactory. Meanwhile, each item's loading is higher on its respective construct than that on any other construct. That indicates the measures exhibited satisfactory discriminant validity. Therefore, the instruments used in the study are adequate.

Hypothesis Testing

The research model was evaluated by running regression procedures in SPSS 11.0. Table 2 contains the regression results used to address hypotheses 1 through 4. PIIT and age were coded as continuous variables, consistent with prior research (Agarwal and Prasad 1998a and Venkatesh et al, 2003). The analysis results suggested that the model was able to explain 74% of the variance (F = 8.66, Sig. = 0.000) in physicians' intentions to use the mobile information system. PIIT and age are important moderators, influencing the strength of perceived usefulness, ease of use and social influence on behavior intention significantly but not that compatibility. Certain other significant *betas* were observed, but the presence of the high-order interaction effects meant that they were not interpretable (Jaccard, Turrisi and Wan, 1990). Further analyses of the results were performed by dividing the sample into 4 groups based on the median value of PIIT and age. The results demonstrated that PU had positive coefficients for 4 groups but was statistically significant only for the more innovative older group. EU had positive coefficients and was statistically significant for 3 groups except for the more innovative older group, which is

negative and non-significant statistically. SI had positive coefficients for the less innovative group (regardless of age) but negative coefficients for the more innovative group (regardless of age). No statistically significant effects were found. Thus, hypothesis H1 was partly supported, that PIIT and age are important moderators, but the interaction effects are stronger for more innovative OLDER (not younger) physicians. H2 is supported, but the interaction effects are also stronger for younger physicians regardless of their PIIT. H3 was partly supported, that is only PIIT is an important moderator, and the interaction effects are almost equal regardless of physicians' PIIT and age. H4 was not supported at all. Results of the "direct effect only" model were also reported. The effects of perceived usefulness, perceived ease of use and compatibility on behavior intention were significant, while that of social influence was not. It only exerted an indirect effect on behavior intention through perceived usefulness confirmed by a further analysis we performed. Hypotheses 5.1 to 5.3 and 6.1 to 6.5 were tested by means of multivariate multiple regression. The Bonferroni post hoc test was used for multiple comparisons of differences among three experience groups. Gender only has a significant effect on a physician's perception of ease of use of the mobile system ($F = 6.58$, $\text{Sig.} = 0.012$). Hands-on experience of the system, however, has significant effects on perceptions of ease of use ($F = 5.68$, $\text{Sig.} = 0.004$) and compatibility ($F = 5.77$, $\text{Sig.} = 0.004$). The post hoc test indicated significant differences between the less experienced, who had used the system less than 6 months, the more experienced, who had used it more than 1 year. Therefore, hypotheses 5.2, 5.3, 6.3 and 6.5 were supported while others were not.

DISCUSSION AND CONCLUSION

This paper aims to explore physicians' behavior intention regarding a mobile medical information system. A research model was proposed and then empirically examined using responses from 121 physicians practicing in the Finnish healthcare sector. The results obtained from regression analysis showed that the model was able to provide a 74% explanation of variance in an individual physician's behavior intentions with regard to the system.

Three of four "interaction term" hypotheses specified by the model were fully or partly supported and were statistically significant at various alpha levels. It might appear that those provide somewhat stronger evidence of moderation of personal innovativeness in IT and age when it comes to a user adopting an innovative mobile technology. When the interaction effect was taken into account, the model provided 20% more explanation than was the case with "direct effect only". Perceived usefulness still has a strong direct effect on physicians' intentions to use mobile technology. Its effects on intention varied with personal innovativeness and age, especially for more innovative older (not younger) physicians. A possible explanation for this surprising result is that older physicians' total knowledge of medicine usually decreases with increasing years of experience. They need the mobile system to compensate the gaps in their knowledge to maintain their professional competence (Jousimaa, 2001). Young physicians, on the other hand, have been overloaded by the increased body of medical knowledge available from up-to-date textbooks and Internet resources. Furthermore, the mobile system has not yet been fully implemented so that young physicians might be slow in recognizing the importance of the "extrinsic rewards" of using the system in their work. Here ease of use appears to be a determinant of intention in most situations: the effect would vary with personal innovativeness and age, stronger for less innovative older physicians as well as for young physicians. Ease of use is usually the secondary determinant of individual adoption of technology and has been shown in past research (e.g., Legris, Ingham and Collette, 2003). In the professional context, i.e. physicians, Chau and Hu (2002 a, b) found that ease of use had limited effects on behavior intention. They argued that physicians, as professionals with a high user competence, were unlikely to consider using a technology simply because it is easy to use. Our findings differ from these results. There are several possible explanations. The mobile medical system studied here is completely different from those PC-based systems in previous studies. When physicians shift from desk-top computers with a large screen to a mobile device with a small screen and small keyboard, the operation of the mobile device itself, e.g. Nokia communicator 9210, might be not easy. The second is that the mobile system delivers similar medical information as current PC-based systems. Physicians still use their desktop computers very often. Therefore, they might expect the mobile system to be used equally easily. The third is that physicians' work is still not very "mobile", particularly for those working in primary healthcare. The nature of their work causes them to regard the mobile system as a complement to rather than a competing tool or replacement for their old "computer" system. In sum, we argue that the importance of ease of use might be over-emphasized by physicians during their early exposure to mobile technology. However, it is worth highlighting its importance in studying user adoption of mobile technology. The strong effect of EU on young physicians is very surprising. A possible explanation might be that young physicians have used PC-based systems more intensively than their older colleagues, and thus it might be hard for them to turn to the mobile system because of the possible high "swift cost". Consequently, the importance of ease of use of the system is assessed rather highly. The strength of social influence also varies in interaction with personal innovativeness in IT and age, but not stronger significantly of any specific groups. The result suggests the importance of social influence in physicians' adoption of mobile technology. In our study, Duodecim as the Finnish medical

Dependent Variable: Behavior Intention (N=121)		
	D ONLY	D+I
R ²	.58	.78
Adjusted R ²	.55	.74
PU	.43(5.19)***	ns
EU	.29(3.28)**	-2.47(-2.96)**
SI	ns	ns
COMP	.21(2.17)*	ns
PIIT	ns	-3.86(-2.60)*
AGE	ns	ns
GENDER	ns	ns
EXPERIENCE	ns	ns
PU*PIIT		-3.71(-2.44)*
EU*PIIT		6.85(4.53)***
SI*PIIT		ns
COMP*PIIT		ns
AGE*PIIT		3.49(2.26)*
PU*AGE		ns
EU*AGE		3.22(3.23)**
SI*AGE		ns
COMP*AGE		ns
PU*PIIT*AGE		5.17(3.11)**
EU*PIIT*AGE		-7.73(-4.55)***
SI*PIIT*AGE		-3.34(-2.02)*
COMP*PIIT*AGE		ns

Notes: 1. D ONLY: Direct effects only; D+I: Direct effects and interaction terms. 2. β (t value) is reported. 3. *p<0.05, **p<0.01, ***p<0.001, ns-not significant.

Table 2 Hypotheses Testing

society strongly influences physicians' technology adoption behavior. The system developer, owned by Duodecim, has organized continuous training to encourage usage of the system. Therefore, it is not surprising that it has important effects on physicians' behavior intention. Evidence to support the effect of compatibility in form of personal innovativeness in IT and age on behavior intention is lacking in our study. Agarwal and Prasad argued that compatibility requires an essential change in the work practice of a potential adopter (1998b, p.213). Thus, its interaction with PIIT and age might significantly affect behavior intention. A possible explanation for this finding is that the mobile system studied is only used in a trial, not really introduced into work practice. It does not call for a change in physicians' work style. Physicians might consider compatibility less important than other perceptions. Gender and experience did not affect behavior intention directly. Their influence on behavior intention would be mediated by ease of use; however, hands-on experience would also affect perceptions of compatibility.

We noticed that, compared with the strength of ease of use, perceived usefulness might not be the first or single determinant of physicians' adoption of mobile technology. Ease of use together with social influence is important determinant beliefs challenging the dominant effect of perceived usefulness on intention. Igarria and Iivari (1995) postulated that Finland is a more feminine and slightly more collective society, so that individuals' abilities, experiences and organizational support, rather than perceived usefulness, are likely to play a major role in affecting usage. In our study context, of physicians as special professional group and the nature of their work, perceived usefulness is a determinant of usage, but might exhibit less explanation power than ease of use when the interaction effects of PIIT and age are taken into account.

Our findings suggest that more innovative older physicians could act as agents of change in promoting the usage of mobile technology in healthcare. Duodecim Publisher Ltd, as a developer and an important social influence, could push physicians' adoption of the system more positively through training sessions and other promotions. The importance of ease of use of the system demonstrated that physicians might hesitate to use the mobile system regardless of the perceived usefulness of the system. The developer should put more effort into making the system easy to use and design a special training program for female physicians in order to mitigate the mental stress they feel when using it. Encouragement to use the system in work practice as much as possible is a must as hands-on experience might alleviate the mental effort and make the system more compatible with physicians' practice.

REFERENCES

1. Ammenwerth, E., Buchauer, A., Bludau, B. and Haux, R. (2000), Mobile information and communication tools in the hospital, *International Journal of Medical Informatics*, 57 (2000) 21-40
2. Agarwal, R. and J. Prasad (1998 a), 'The antecedents and consequents of user perceptions in information technology adoption', *Decision Support Systems*, Vol. 22, No. 1, pp. 15-29
3. Agarwal, R. and J. Prasad (1998 b), A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology, *Information Systems Research*, Vol.9, No.2, June 1998, pp204-215
4. Chau, P.Y.K. and Hu, P.J. (2002 a), 'Investigating healthcare professionals' decisions to accept telemedicine technology: An empirical test of competing theories', *Information & Management*, Vol. 39, No. 4, pp. 297-311
5. Chau, P.Y.K. & Hu, P.J. (2002 b), 'Examining a model of information technology acceptance by individual professionals: An exploratory study', *Journal of Management Information Systems*, Vol. 18, No. 4, pp. 191-229
6. Davis, F.D.; Bagozzi, R.P. and Warshaw, P.R., "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Science* (35:8), August 1989, pp. 982-1003.
7. Doll, W.J, A. Hendrickson & X. Deng (1998), 'Using Davis's Perceived Usefulness and Ease-of-use Instruments for Decision Making: A Confirmatory and Multigroup Invariance Analysis', *Decision Sciences*, Vol. 29, No. 4, pp. 839-869
8. Gefen, D. & D.W. Straub (1997), 'Gender Differences in the Perception and Use of E-Mail: An Extension to the Technology Acceptance Model', *MIS Quarterly*, Vol. 21, No. 4, pp. 389-400
9. Goldberg, S. and Wickramasinghe, N. (2003), 21st Century Healthcare-The Wireless Panacea, In the proceedings of the 36th HICSS, 2003
10. Igarria, M. & J. Iivari (1995), 'The Effects of Self-efficacy on Computer Usage', *OMEGA International Journal of Management Science*, Vol. 23, No. 6, pp. 587-605
11. Jaccard, J., Turrise, R., and Wan., C.K. (1990), *Interaction effects in multiple regression*, Series: Quantitative applications in the social sciences, Series 72. Sage Publications Ltd., London, U.K.
12. Jousimaa J.(2001): The clinical use of computerised primary care guidelines, Doctoral Dissertation, University of Kuopio, Finland.

13. Legris P., Ingham J. and Collette P.(2003), Why do people use information technology? A critical review of the technology acceptance model, *Information & Management* 40 (2003) 191-204
14. Morre, G.C., and Benbasat, I. (1991), Development of an instrument to measure the perception of adopting and information technology innovation. *Information systems Research*, 2(3), 192-223
15. Pedersen, P. and Nysveen, H. (2003), Usefulness and Self-Expressiveness: Extending TAM to explain the Adoption of a mobile parking Services, In the proceeding of 16th Beld eCommerce Conference, Bled, Slovenia, June 9-11, 2003
16. Pedersen, P., Nysveen, H. and Thorbjornsen, H. (2003), The adoption of mobile serves: a cross service study. Available at <http://ikt.hia.no/perrep/publications.htm>
17. Pederson P.E: (2002), Adoption of mobile Internet services: An exploratory study of mobile commerce early adopters. 2002, Available at: <http://ikt.hia.no/perrep/publications.htm>
18. Stammer, Lisa (2001), Nine Hot trends: Wireless, *Healthcare Informatics*, February 2001pp.50-54
19. Taylor, S. & P. Todd (1995), 'Assessing IT Usage: The Role of Prior Experience', *MIS Quarterly*, Vol. 19, No. 4, pp. 561-570
20. Teo, T.S.H., V.K.G. Lim & R.Y.C. Lai (1999), 'Intrinsic and extrinsic motivation in Internet usage', *OMEGA International Journal of Management Science*, Vol. 27, No. 1, pp. 25-37
21. Teo, T.S.H. and Pok S.H. (2003), Adoption of WAP-enabled mobile phones among Internet users, *Omega The International Journal of Management Science*, (31), pp483-498
22. Thompson, R.L., Higgins, C.A., and Howell, J.M. (1994), Influence of experience on personal computer utilization: Testing a conceptual model. *Journal of management information systems*, 11(1), 167-187
23. Venkatesh, V. & M.G. Morris (2000), 'Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior', *MIS Quarterly*, Vol. 24, No. 1, pp. 115-139
24. Venkatesh V., Morris, M.G., Davis, G.B. and Davis, F.D.(2003), User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly*, Vol.27 No.3 pp. 425-478/ September,2003