Information & Management 46 (2009) 190–195

Contents lists available at ScienceDirect

Information & Management

journal homepage: www.elsevier.com/locate/im

The impact of use context on mobile services acceptance: The case of mobile ticketing☆

Niina Mallat, Matti Rossi, Virpi Kristiina Tuunainen *, Anssi Öörni

Helsinki School of Economics, Finland

ARTICLE INFO

Article history:
Received 5 August 2006
Received in revised form 20 April 2008
Accepted 17 November 2008
Available online 20 February 2009

Keywords:
Mobile ticketing
Mobile services acceptance
Mobile commerce
Use context
Mobility
Technology adoption
Technology acceptance

ABSTRACT

The most important factor in the decision to adopt mobile systems is user perception of their value. However, behavioral theory suggests that context affects user attitude and therefore influences acceptance. We therefore hypothesized that the benefits of mobile systems should be evaluated against users' contextual needs and that reduced dependence on time and place required providing service at any time and place needed by the user. Mental costs or costs of learning to use the system, however, may not be evaluated in the same way, because system use and learning about it are acts with different contexts. Our findings advance knowledge of IT adoption and suggest that we should start to identify the contexts of both the benefits of use and in learning to use the system.

1. Introduction

Studies of mobile commerce suggest that there is general consumer interest in the services it provides (e.g. [16]): purchases on web sites, electronic receipts and tickets, routine bank service, peer-to-peer payments, etc. are typical applications. Its adoption, however, has been slower than expected, and it has been argued that this stems from the complexity of its transactions, lack of user-friendly mobile portals, and slow connectivity [9]. These mostly relate to *ease of use* (EoU) and *perceived usefulness* (PU) constructs in diffusion of innovation theory [5,22]. The deliberative theories of behavior recommend that all measurements for attitudes influencing decisions should be formulated similarly with respect to their elements of action, target, time, and context of behavior.

In our study we attempted to explain the intention to use mobile commerce by examining an area where it has been quite successful: mobile ticketing on public transportation. We based our framework on TAM [11] and the diffusion of innovation theories, and augmented them with factors from consumer behavior and human–computer interaction research. Specifically, we included use context as a contextual factor in our study and examined whether it impacted the adoption of mobile commerce.

Empirical data for our study was collected in Helsinki Public Transportation, which has offered a mobile ticketing service since 2001, first in trams and the underground, and recently also in local trains, ferries, and buses. Our findings suggested that the use context, including local conditions, such as the availability of other means to purchase the ticket and time pressure were a significant determinant for intention to use mobile ticketing. Furthermore, according to our model, use context fully mediated the effect of usefulness and mobility on intention to use, suggesting that the benefits of mobile services were dependent on situations in which they are used. The results differed from the results of other IS adoption studies and indicated that the general adoption theories need to be augmented with mobile and situational factors.

2. Related research

We first looked at technology adoption in general and mobile services in particular. Based on these we developed our research hypotheses. In the mobile commerce context, several studies have examined the adoption of mobile technologies and services; TAM and innovation diffusion theory have provided ways of explaining mobile service adoption and use (see [4,20]).

☆ An earlier version of this paper was published in the Proceedings of the 39th Hawaii International Conference on System Sciences and won a best paper award there.

* Corresponding author at: Helsinki School of Economics, P.O. Box 1210, 00101 Helsinki, Finland. Tel.: +358 9 43138255; fax: +358 9 43138700.
E-mail address: virpi.tuunainen@hse.fi (V.K. Tuunainen).

0378-7206/$ – see front matter © 2009 Elsevier B.V. All rights reserved.
doi:10.1016/j.im.2008.11.008

2.1. TAM

TAM was developed to predict end-user acceptance of IS within organizations. It originated from the Theory of Reasoned Action (TRA) [1], and proposed a behavioral model where two beliefs, perceived EoU and PU, were the prime predictors of use intention.

A body of research has demonstrated the explanatory power of TAM in predicting use of various IT. Wu and Wang [24] examined mobile commerce acceptance and found that EoU and PU were significant factors affecting mobile commerce use. Thus, we proposed:

H1. Perceived ease of use has a direct positive effect on consumer intention to use mobile ticketing service.

H2. Perceived usefulness has a direct positive effect on consumer intention to use mobile ticketing service.

2.2. Diffusion of innovations

The Diffusion of Innovations theory postulated that five characteristics affected the adoption of an innovation: relative advantage, complexity, compatibility, trialability, and observability. Moore and Benbasat [17] developed a measurement instrument for this: the perceived characteristics of innovating (PCI).

Prior research showed that diffusion theory was useful in predicting adoption of different technologies including the use of spreadsheet software [3] and smart cards [19].

Early stage research on mobile banking adoption in the UK confirmed a relative advantage over existing services, compatibility of mobile banking with consumer needs and lifestyle, and the ability to test a new service and observe the successful efforts of other users due to an increased positive attitude towards adopting, whereas perceived complexity and risk had a negative effect on attitudes to adoption [14].

There is substantial similarity between PU and EoU beliefs and the relative advantage and complexity constructs [23]. The constructs can be considered as parallel and, together with compatibility, they have been found to be the most constant determinants of adoption. Previous research suggested that these were separate constructs. We therefore propose compatibility as a determinant of mobile ticketing adoption:

H3. Compatibility has a direct positive effect on consumers' intention to use mobile ticketing service.

2.3. Mobility and mobile use context

2.3.1. Mobility

Computer Supported Collaborative Work and human–computer interactions (HCI) have provided insight into the characteristics, requirements, and implications of mobile technology use. The term *mobility* and ubiquitous or nomadic computing refers to movement of technologies, people, settings, etc. Compared with traditional e-commerce, mobile computing provides access to information, communication, and services independent of time and place. Lyytinen and Yoo [15] postulated that mobility, digital convergence, and scale, were the three main drivers of the nomadic information environment. According to Kakihara and Sørensen [12], contexts in which people reside continuously frame their interaction with others, including their cultural background, situation or mood, and degree of mutual recognition.

In studies on mobility in work contexts, workers were considered to be mobile; wandering, traveling, and visiting strongly affects workers, whose mobility is enabled and facilitated by new technologies. Consumers, however, have always been mobile when traveling to get a service, make a purchase, or withdraw cash from their bank. Mobile technologies do not necessarily increase consumers' mobility, but may reduce their need to travel. Consumers no longer need to visit a newsstand, a record shop, or a ticketing machine before stepping onto a bus. Thus *mobility* in our study is used to express the benefits of time and place, service access, and use. While mobility may appear similar to the usefulness or relative advantage construct, the key difference is that usefulness captures the benefits of technology in general, whereas mobility focuses on the advantages of mobile technology. We therefore expected the effect of these constructs to differ.

2.3.2. Use context

Mobile technologies have changed the users' mode of operation; they have started to carry the devices in their pockets or handbags and use them almost anywhere. Consequently, the use environment has become an issue [7]. We therefore assumed that the use context was an essential factor in affecting user acceptance of mobile systems.

Perry et al. [18] discussed the restrictions that different use contexts pose to ubiquitous computing. They noted that access depended on technological and social conditions of the environment; not all places provided the technological infrastructure for ubiquitous computing, and not all situations were socially acceptable or convenient. They concluded that technologies designed for mobile computing should be more flexible and adaptable.

Belk [2] defined five categories of the environment:

a) Physical, including geographical and institutional location, sounds, sights, and the weather;
b) Social, defined by interpersonal interaction and the influence of others;
c) Temporal, consisting of a point in time or the time relative to some past or future event;
d) Task definition, specifying the needed function and the way in which it is used; and
e) Antecedent states, as a consequence of a user's mood or condition, such as loose change available.

Figge [8] studied situation-dependent mobile services and modeled possible service access situations as a three-dimensional space involving the user's identity, location, and time of access. A more structured definition was provided by Lee et al. [13] who split context into physical environment and human/personal factors, and provided more detailed subgroups within the categories.

Previous e-commerce studies have suggested that use context has a significant impact on store and product selection, as well as on consumer choice of purchase channel and perception its attributes that determine choice [10]. Dabholkar and Bagozzi [6] studied consumer intention to use self-service technologies and found that two factors, perceived waiting time and crowding, had significant mediating effect on the formation of attitude and use intention.

In our study, we measured use context as a construct representing the conditions that users meet when they use mobile services in different places and times. We wanted to demonstrate that people tend to evaluate different benefits of mobile services at two levels: at the first, evaluations are made relative to a reference point—thus use context serves as the point for evaluating mobility related benefits and the general performance gains, while, at the second, evaluations are less situation dependent, such as compatibility and other-than-out-of-pocket costs. EoU, for example, includes the cost of time invested in the learning process, which is seldom for a particular event. Similarly, compatibility depends on the person's ability to link the new technology with previous use experience, values, and preferences. Therefore, we expected that EoU and compatibility would seldom be evaluated relative to a

specific situation but against the more general background of use. Use context is expected to mediate the benefits of mobility and PU of mobile services, which captures the generic benefits of the use of a new technology, such as efficiency increase or time saving, and it has been found effective in predicting the use of technologies. We therefore expected that the PU of mobile ticketing be mediated by the user context, such as a need to respond rapidly. The increased efficiency of mobile ticketing, for example, may be less apparent when the customer is carrying cash or does not need the ticket immediately. We thus proposed the hypothesis:

H4. Use context mediates the effect of usefulness on consumer intention to use mobile ticketing service.

At home or in an office, a user is likely to find a computer more convenient for accessing email, for example. But when the person is traveling and needs to access email quickly, the benefits of mobility actualize, and the mobile service is perceived as useful. Similarly, situational factors, such as lack of alternative payment methods, urgency in getting the ticket, or unexpected need for a ticket, are likely to mediate the effect of perceived specific benefits of mobile technology, such as immediate access and the possibility of avoiding queues, on intention to use a mobile ticketing service. While usefulness and mobility are both benefits of technology, the difference is that usefulness is generic to all technologies such as payment cards and mobile payments, whereas mobility captures the benefits offered by mobile technology only. We therefore expected users to treat them as separate constructs.

H5. Use context mediates the effect of mobility on consumer intention to use mobile ticketing service.

Finally, we expected that the user context would have a direct effect on technology use. In the mobile ticketing context, bad coverage due to "dead spots", could directly impact user intention to adopt the service. Thus:

H6. User context has a direct positive effect on consumer intention to use a mobile ticketing service.

3. Research method

We studied the use of mobile ticketing in practice through a survey of the users of mobile ticketing service in the public transport of the city of Helsinki.

3.1. Our proposed model

We constructed a research model, as shown in Fig. 1. The model was based on TAM and diffusion of innovations theory augmented with factors that characterized specific features of mobile services adoption. Out of pocket costs are often a major barrier to technology adoption. But, in this case, adoption involved no up-front costs. The cost of a single ticket was lower (by 0.10€), when bought by mobile phone. Initial tests showed no statistically significant co-variation between ticket price and adoption intent. Thus, price was not included in the research model.

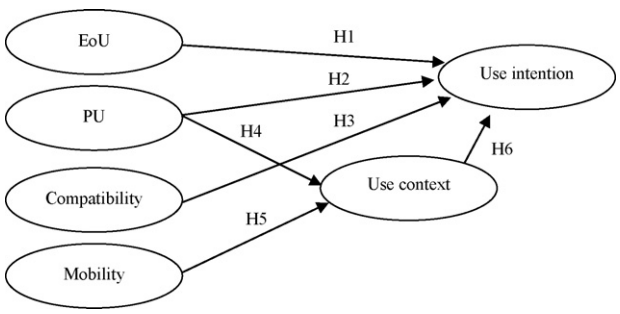

Fig. 1. Our research model.

3.2. The mobile ticketing service

In 2001 Helsinki Public Transport launched a short message (SMS) based system for selling public traffic tickets. Since then, over 10 million mobile tickets have been sold and, about 20% of all adult single tickets are purchased through this channel.

The tickets can be bought by sending a four character SMS to a premium service number. As a return message, the customer receives a single ticket, which is valid for the next hour on trams, subway, local trains, and some ferries and buses. The ticket costs €2.00 and is cheaper than a single ticket (€2.20) bought in the vehicle for cash. The SMS ticket must be bought before entering the vehicle or the subway platform area. The tickets are billed through mobile phone operators' billing systems. Currently the service is limited to subscribers of the top five mobile phone operators in the Helsinki area. Other options for purchasing a public transport ticket are *cash* and a smart card system called *travel card*.

3.3. Instrument development

For data collection, we developed a self-administered mail survey. Measurement scales for EoU, PU, compatibility, and use intention items were taken from existing scales [21], with modified wordings to adapt the items to the our topic area.

The basis for the use context measurement items was based on a literature review complemented by findings of a Helsinki Public Transport customer survey of mobile ticketing service users, which suggested that users perceive mobile ticket as especially valuable when they are in a hurry or do not have cash or a travel card available, etc. Development of the mobility scale was also based on prior work also complemented by results from the customer survey. All scale items were measured on seven-point Likert scales, ranging from *totally agree* to *totally disagree*.

In a pretest phase, the questionnaire was reviewed by a small group of IS faculty and doctoral students at the Helsinki School of Economics, and the scales were modified as a result of their suggestions. The questionnaire was then tested with a sample of 47 business school students and personnel. This resulted in some further modifications to the questions. The purpose of these pretests was to confirm that relevant aspects were included and to enhance the clarity and readability of the questionnaire. The final questionnaire of 26 items measuring six latent variables is presented in Appendix A.

3.4. Data collection

The target population for the survey was all Helsinki citizens. According to the Helsinki Public Transport customer survey, there was a preponderance of mobile ticketing users in the inner city area. As it was important to reach a representative sample of both users and non-users, we adopted a stratified sampling method: the population is divided into non-overlapping strata and samples are randomly drawn from each stratum, then results were pooled. The two strata were Helsinki inner and outer city regions identified and separated by postal codes.

Respondents were selected randomly from both strata among 15- to 50-year-old citizens. Younger and older age groups were excluded because they were entitled to reduced public transport fares and were therefore not target groups for mobile ticketing. A self-administered mail survey was sent to 500 inner city and 500 outer city citizens in December 2004. As an incentive to participate, a lottery was organized among the respondents: it involved a drawing for a mobile phone and 15 public transport travel cards. Questionnaires were mailed with addressed, stamped return envelopes, a reply coupon for the drawing, and a cover letter requesting a response within 2 weeks. A reminder letter was sent

Table 1
Respondent demographics.

	Sample	Helsinki population
Gender (%)		
Female	62	53
Male	38	47
Region		
Inner city	54	–
Outer city	46	–
Education		
Elementary school	14	33
High school and lower occupational	42	34
Higher occupational	15	12
University	27	21
Age		
<20	10	9*
20–30	40	33*
31–40	29	30*
41–50	22	27*
Experience in mobile ticket use		
Yes	48	–
No	52	–

* Calculated to correspond to the sample.

during the second week to those who had not returned their questionnaire. Of the 1000 mailed questionnaires 373 were returned and 360 were acceptable. The response rate was thus 36%, which is at par with social sciences surveys and, hence, acceptable.

4. Results

4.1. Descriptive statistics

The demographic profile of the respondents is presented in Table 1; it shows that 62% of the respondents were female. The average age of respondents was 32 years. Approximately half of them had used the mobile ticketing service during the time of the survey. The survey sample provided a reasonable representation of the city, except that females were slightly overrepresented; possibly females use public transportation more.

The proposed research model was then evaluated using SEM. The analysis followed a two-step procedure: first, the measurement model was composed to establish the validity and reliability of the theoretical constructs. Second, the structural model was used to conduct a path analysis and test our hypotheses.

4.2. Measurement model

The hypothesized model included 26 observed items measuring six latent constructs: EoU, PU, compatibility, mobility, use context, and use intention. Before analyzing the measurement model, the constructs were tested using principal axis factoring with varimax rotation using Lisrel 8.5. Three items were dropped from further analysis due to high cross loadings. Next, we estimated the measurement models for the independent and dependent constructs. To determine a fixed scale, one loading was set equal to 1 in each factor. The estimated loadings for all remaining items were significant: with t-values between 9.15 and 34.45 supporting individual item reliability. Subsequently, we calculated the Cronbach α values, composite reliability, and variance extracted measures to assess construct reliability. Composite reliability depicted the internal consistency of the construct indicators, whereas variance extracted reflected the overall amount of variance in the indicators due to the latent construct. All measures clearly exceeded the recommended minimum values, as shown in Table 2.

In the light of the results, reliability and validity of the constructs in the model were deemed satisfactory.

4.3. Structural model

Next we tested the causal hypotheses of our research model by using SEM. We examined the model in terms of model goodness of fit, overall explanatory power, and hypothesized individual causal links.

The overall goodness of fit was evaluated using different criteria. We used seven indices: normalized fit index (NFI), comparative fit index (CFI), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), RMS error of approximation (RMSEA), 90% confidence interval for the RMSEA, and χ^2 divided by degrees of freedom (instead of χ^2 as it is sensitive to large sample sizes). The recommended acceptance criteria for these indices and our results are shown in Table 3. While GFI and RMSEA measures did not quite meet the minimum recommended values, the test statistics demonstrated good enough values to suggest reasonably adequate model fit. Specifically, the 90% confidence interval for RMSEA showed that it stayed within the suggested limits of 0.05 and 0.08 and the measure was able to meet the alleviated 0.06, typical acceptance criteria.

The overall explanatory power of the model was next estimated by looking at the R^2 values for the two dependent variables. The usefulness and mobility constructs explained 42% of the variance observed in consumers' perceptions of mobile tickets' applicability in different use contexts. Furthermore, EoU, compatibility, and user location explained 55% of the variance in consumers' intention to use mobile tickets in future. These explanation rates demonstrate highly satisfactory values.

The data provided support for most of our hypotheses. EoU and compatibility had a direct positive relationship to use intention with standardized path coefficients of 0.12 and 0.68, respectively. This provided support for hypotheses H1 and H3. A surprising result was that the direct path between PU and use intention was insignificant, and thus hypothesis H2 was rejected. Instead, the effects of PU and mobility on use intention were fully mediated by use context, with path coefficients of

Table 2
Construct reliability measures.

Construct	Item *t*-values	Item R^2	Items dropped	Cronbach α (>0.7)	Composite reliability (>0.7)	Variance extracted (>0.5)
EoU	22.76–26.99	0.71–0.92	–	0.95	0.95	0.82
PU	20.35–34.45	0.66–0.86	2	0.92	0.92	0.79
Compatibility	21.05–27.24	0.69–0.87	–	0.93	0.93	0.78
Mobility	13.73–16.13	0.45–0.76	1	0.84	0.86	0.61
Use context	11.85–13.95	0.43–0.74	–	0.86	0.87	0.57
Use intention	9.15–49.11	0.33–0.94	–	0.88	0.91	0.78

Table 3
Overall model goodness of fit.

Model goodness-of-fit index	Decision criteria	Result
χ^2 degrees of freedom	<3.0	2.32
NFI	>0.9	0.97
CFI	>0.9	0.98
GFI	>0.9	0.87
AGFI	>0.8	0.83
RMSEA	<0.05 (0.06)	0.06
90% confidence interval for RMSEA	0.05; 0.08	0.05; 0.07

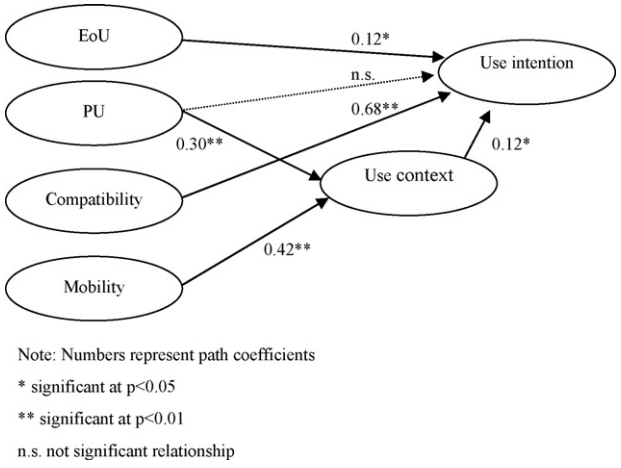

Fig. 2. The estimated structural model.

0.30 and 0.42. Hypotheses H4 and H5 were thus supported. Finally, use context had a direct positive effect on use intention with a 0.12 path coefficient providing support for hypothesis H6. The results are shown in Fig. 2.

5. Discussion

We examined consumer adoption of mobile services and presented results from a study of mobile ticketing service adoption. Our findings suggest that there are two types of benefits of mobile ticketing service use. The first, usefulness, describes the generic efficiency increase due to new technology use. The second, mobility, includes time and place independent service access, reduced queuing, and substituting for other services.

Use context was a new concept in our model; it was found to be a significant determinant for consumers' intention to use the mobile ticketing service. Furthermore, use context fully mediated the effect of mobility and usefulness on use intention, implying that users valued the benefits of the mobile ticketing service in situations where they were in a hurry, where other ticketing alternatives were not available, when the need for a ticket was unexpected, or where there were queues at points of sale.

Compatibility of mobile services with users' general habits and their ways to access and use services with the mobile phone, can be considered as a precondition for service adoption and therefore independent of use context.

5.1. Theoretical contribution

Our results suggest that users consider two different types of benefits of mobile ticketing service adoption; performance-related usefulness, and the spatially and temporally improved service access enabled by mobile technology. Our findings also indicated that the benefits were fully mediated by use context, while the effects of EoU and compatibility on adoption intention were not dependent on use context.

The EoU and compatibility factors affected use intention directly. It appears that consumers have situation independent reference points for evaluating these factors. It is noteworthy that compatibility was overwhelmingly the most important adoption determinant in our study. It implied that consumers resented dramatic changes brought into their daily lives by new technologies.

Finally, our results suggested that mobile ticketing did not substitute for other ticket alternatives but offered an additional option providing value for users in new situations. As the mobile channel is used in parallel with others, the mobile adoption decision is no longer a one-time choice to replace an older technology but a continuously ongoing process of comparing alternative options under different situations.

5.2. Practical implications

From a managerial point of view, our results provided important implications by suggesting that the competitive advantages of mobile services were due to its ubiquitous service access and ability to react to demands posed by different use contexts. The developers of new mobile services should build on the benefits of mobility: it is important to determine situations where the service is likely to be used and provide features that are valuable for users in those situations. Successful mobile services will provide users with timely services that are easily accessed and tailored to the needs of specific users and their location. Such services can also be used as a substitute when regular service is not available (e.g. when a ticket booth is closed). In these situations, mobile self-service can be seen as extremely beneficial and users might be willing to pay a premium for it. Finally, mobile services must be widely applicable and compatible with consumers' past behavior.

5.3. Limitation

Our study examined only one type of mobile service: mobile ticketing but not mobile information and entertainment services, using the Internet and traditional channels.

6. Conclusion

Our study developed and tested a mobile adoption model that addressed the features of mobile technologies and services; it was found significant in predicting mobile service adoption. Our analysis offers new insights on consumer adoption of services through assessment of their structure. We incorporated a new construct, use context, in our model and demonstrated that it mediated the effect of perceived benefits on user intention to adopt the technology, while other decision factors, such as EoU and compatibility, had a direct effect.

Our paper has thus provided advice that can advance the development and marketing of mobile services.

Appendix A

Table A.1

Table A.1
Measurement items.

Ease of use (EoU)	
Learning to use the mobile ticket is easy	
Purchasing a mobile ticket is easy	
Purchasing a mobile ticket is clear and understandable	
It is easy for me to perform the actions required to purchase a mobile ticket	
Usefulness	
It's faster to buy tickets with mobile phone	
It's easier to buy tickets with mobile phone	
It's more effective to buy tickets with mobile phone	
Mobile phone enhances my possibilities for buying a ticket	Dropped
Mobile phone is a useful device for purchasing tickets	Dropped
Compatibility	
Purchasing mobile tickets is compatible with my other use of mobile phone	
Purchasing mobile tickets is a suitable method for me to purchase tickets	
Using mobile tickets is compatible with my style and habits	
Mobile ticket is compatible with my way to use public transportation	
Mobility	
Purchasing a ticket with a mobile phone reduces queuing	
Purchasing mobile tickets is independent of time	
Purchasing mobile tickets is independent of place	
I can substitute the need for cash or travel card by purchasing a mobile ticket	
Purchasing mobile tickets is convenient because the phone is usually with me	Dropped
Use context	
I use/expect to use mobile tickets if...	
Travel card has no value or the period is expired	
I have no cash for purchasing the ticket	
I'm in a hurry or need the ticket fast	
I need the ticket unexpectedly and have not prepared for purchasing it	
If there are queues in points of ticket sale	
Use Intention	
I intend to purchase single tickets with mobile phone during the next three months	
I believe I will use mobile tickets during the next three months	
I believe my interest towards mobile tickets will increase during the next three months	

References

[1] I. Ajzen, M. Fishbein, Understanding Attitudes and Predicting Social Behavior, Prentice Hall, Englewood Cliffs, NJ, 1980.
[2] R.W. Belk, Situational variables and consumer behavior, Journal of Consumer Research 2 (3), 1975, pp. 157–164.
[3] J.C. Brancheau, J. Wetherbe, The adoption of spreadsheet software: testing innovation diffusion theory in the context of end-user computing, Information Systems Research 1 (2), 1990, pp. 115–143.
[4] G.C. Bruner II, A. Kumar, Explaining consumer acceptance of handheld Internet devices, Journal of Business Research 58 (5), 2005, pp. 553–558.
[5] D. Cyr, M. Head, A. Ivanov, Design aesthetics leading to m-loyalty in mobile commerce, Information & Management 43 (8), 2006, pp. 950–963.
[6] P.A. Dabholkar, R.P. Bagozzi, An attitudinal model of technology-based self-service: moderating effects of consumer traits and situational factors, Journal of the Academy of Marketing Science 30 (3), 2002, pp. 184–201.
[7] P. Dourish, What we talk about when we talk about context, Personal and Ubiquitous Computing 8 (1), 2004, pp. 19–30.
[8] S. Figge, Situation-dependent services—a challenge for mobile network operators, Journal of Business Research 57 (12), 2004, pp. 1416–1422.
[9] M.N. Frolick, L.-d. Chen, Assessing m-commerce opportunities, Information Systems Management 21 (2), 2004, pp. 53–61.
[10] K.C. Gehrt, R.-N. Yan, Situational, consumer, and retailer factors affecting Internet, catalog, and store shopping, International Journal of Retail & Distribution Management 32 (1), 2004, pp. 5–18.
[11] S. Hong, J.Y.L. Thong, K.Y. Tam, Understanding continued information technology usage behavior: a comparison of three models in the context of mobile internet, Decision Support Systems 42 (3), 2006, pp. 1819–1834.
[12] M. Kakihara, C. Sørensen, Expanding the 'mobility' concept, ACM SIGGROUP Bulletin 22 (3), 2001, pp. 33–37.
[13] I. Lee, J. Kim, J. Kim, Use contexts for the mobile internet: a longitudinal study monitoring actual use of mobile internet services, International Journal of Human–Computer Interaction 18 (3), 2005, pp. 269–292.
[14] M.S.Y. Lee, P.J. McGoldrick, K.A. Keeling, J. Doherty, Using ZMET to explore barriers to the adoption of 3G mobile banking services, International Journal of Retail & Distribution Management 31 (6), 2003, pp. 340–348.
[15] K. Lyytinen, Y. Yoo, Research commentary: the next wave of nomadic computing, Information Systems Research 13 (4), 2002, pp. 377–388.
[16] N. Mallat, Exploring consumer adoption of mobile payments—a qualitative study, The Journal of Strategic Information Systems 16 (4), 2007, pp. 413–432.
[17] G.C. Moore, I. Benbasat, Development of an instrument to measure the perceptions of adopting an information technology innovation, Information Systems Research 2 (3), 1991, pp. 192–223.
[18] M. Perry, K. O'hara, A. Sellen, B. Brown, R. Harper, Dealing with mobility: understanding access anytime, anywhere, ACM Transactions on Computer–Human Interaction 8 (4), 2001, pp. 323–347.
[19] C.R. Plouffe, J.S. Hulland, M. Vandenbosch, Research report: Richness versus parsimony in modeling technology adoption decisions-understanding merchant adoption of a smart card-based payment system, Information Systems Research 12 (2), 2001, pp. 208–222.
[20] C.L. Sia, H.H. Teo, B.C.Y. Tan, K.K. Wei, Effects of environmental uncertainty on organisational intention to adopt distributed work arrangements, IEEE Transactions on Engineering Management 51 (3), 2004, pp. 253–267.
[21] S. Taylor, P.A. Todd, Understanding information technology usage—a test of competing models, Information Systems Research 6 (2), 1995, pp. 144–176.
[22] Y.-S. Wang, H.-H. Lin, P. Luarn, Predicting consumer intention to use mobile service, Information Systems Journal 16 (2), 2006, pp. 157–179.
[23] V. Venkatesh, M.G. Morris, G.B. Davis, F.D. Davis, User acceptance of information technology: toward a unified view, MIS Quarterly 27 (3), 2003, pp. 425–478.
[24] J.-H. Wu, S.-C. Wang, What drives mobile commerce? An empirical evaluation of the revised technology acceptance model Information & Management 42 (5), 2005, pp. 719–729.

Niina Mallat received her PhD (Econ) in information systems science at the Department of Business Technology of Helsinki School of Economics (HSE). Her research focuses on mobile payments, electronic and mobile business, and technology adoption. She has published articles in journals such as *Communications of the ACM, Journal of Strategic Information Systems and Electronic Commerce Research and Applications,* and *e-Service Journal*. She currently works as a consultant for Accenture SITE practice.

Matti Rossi is a professor of information systems at Helsinki School of Economics. He has worked as Research Fellow at Erasmus University Rotterdam, Visiting Assistant Professor at Georgia State University, Atlanta, and Visiting Professor at Claremont Graduate University. He received his Ph.D. degree in Business Administration from the University of Jyväskylä in 1998. He has been the principal investigator in several major research projects funded by the Technological Development Center of Finland and Academy of Finland. His research papers have appeared in journals such as *CACM, Journal of AIS, Information and Management* and *Information Systems*, and over 30 of them have appeared in conferences such as ICIS, HICSS and CAiSE.

Virpi Kristiina Tuunainen is a professor of information systems science at the Department of Business Technology, and Director of GEBSI (Graduate School for Electronic Business and Software Industry) of Helsinki School of Economics (HSE). Her research focuses on electronic and mobile business, software industry, and economics of IS. She has published articles in journals such as *MIS Quarterly*, *Communications of the ACM*, *Journal of Management Information Systems*, *Journal of Strategic Information Systems, Information & Management* and *Information Society*.

Anssi Öörni is a professor (act.) of information systems at the Helsinki School of Economics. He received his M.Sc. and Ph.D. in Economics at the Helsinki School of Economics. His current research interests comprise consumer behaviour in electronic markets and diffusion of information systems. He has published his work in the *European Journal of Information Systems, Information Technology and Tourism,* and *The Journal of Travel Marketing.*