

Instrumentality challenged: the adoption of a mobile parking service

Per E. Pedersen

Professor

Agder University College

Email: per.pedersen@hia.no

Abstract

Uses and gratifications and domestication research suggest that the gratifications obtained from mobile services go far beyond the instrumentality of flexibility and availability. On the other hand, ICT-adoption research focuses instrumentality by relying on concepts of usefulness and ease of use to explain the adoption of information and communication services of all kinds. Mobile parking services represent a crucial test of the importance of instrumental versus non-instrumental gratifications of mobile services. In a Norwegian field study, 459 early adopters of mobile parking services were studied using an extended model based upon the theory of planned behavior including instrumental, non-instrumental, social and resource-based determinants of adoption. The results show that even if mobile parking services have been designed to meet the functional needs of the parking car driver, derived motivations of expressiveness are just as important as perceived usefulness to the individual end-user's adoption of the services.

1. Introduction

Previous studies in uses and gratifications and domestication research have investigated the adoption and uses of current mobile services users. Naturally, the findings in these traditions do not necessarily generalize to current non-users. On the other hand, findings in these research traditions consistently emphasize the importance of non-instrumental motivational factors in mobile service adoption and use (Leung and Wei, 2000, Kaseniemi and Rautiainen, 2002, Skog, 2002, Taylor and Harper, 2001a, b). In a recent series of surveys in adoption research, we have also investigated the adoption of mobile data services (Pedersen et al., 2002). Our findings so far indicate that even current non-users are influenced by non-instrumental gratifications in their potential adoption and use of mobile services.

To further investigate the influence of motivational, attitudinal, social and resource-based determinants of mobile service adoption in new user groups, a study of new users exposed to instrumental services may provide a kind of "crucial test" of the importance of different motivational versus social processes in mobile service adoption. To investigate this issue, mobile parking services were chosen as an appropriate instrumental mobile service, and an empirical study of the adoption requirements of new users of mobile parking services was conducted.

Mobile parking services are used to pay for car parking at selected parking sites. These services are typically used by calling in or texting in to a central server the starting and stopping of parking time. In the car window, a bar-code identifying the customer is

placed so that parking site personnel scan the bar code to check if parking has been paid for. Alert services are also typically provided so that customers may prolong their parking time without having to return to their car. Except from alert services, very few other value added services are currently provided. When compared to other mobile data services, mobile parking services of this kind provides no communication or coordination support typical of many successful mobile data services. The service investigated here also provides very limited informational content both directly and in the form of value added services. As such it is well suited as a purely instrumental transactional service often believed to be adopted purely for instrumental reasons of ease of use, usefulness, relative advantage, availability and flexibility.

2. Model

The theory of planned behavior (TPB) has its origin in social psychology but has long been applied to the adoption of ICT's, and includes instrumental, social and resource-based influences on technology adoption (Ajzen, 1991). We have previously applied this theory to the adoption of mobile services with considerable success (Pedersen, 2001, 2002, Pedersen et al., 2002), and suggest applying a re-specified and extended model based upon this theory to explain the adoption of mobile parking. In figure 1, this modified TPB-model is illustrated. We use this illustration as a basis for the discussion of how the general TPB-model has been extended and modified.

Insert figure 1 here

Two issues are of relevance with respect to *ease of use* in the model. Because many early adopters of mobile services are expected to be younger, more skilled and more innovative, the higher competence of these users and their more exploratory and advanced use of service functionality suggest ease of use should have less influence in adoption models of new mobile data services. However, studies also report a more playful use of mobile phones among younger and innovative users and consequently they are more focused on exploring the functionality of a service (Oksman and Rautiainen, 2001). Studies have also indicated a relationship between digital capital and symbolic capital suggesting that services designed for young users should not be too easy to use (Taylor and Harper, 2001b) because then, no status would stem from being able to handle the device, application or service. This explanation may also generalize to innovative users. The other issue is that of service differences in the importance of ease of use. For example, studies applying the perspective of "flow" and "telepresence" have shown that to provide intrinsic motivation, some services must represent a certain challenge to the user. Challenge positively influences flow through increased telepresence (Novak et al, 2000; Hunter and Kalafatis, 2001). This, in turn, implies that we might expect a negative effect of ease of use (challenge inversed) on perceived enjoyment for highly involved users and for services which are used for reasons of intrinsic motives.

Perceived *usefulness* was originally seen as a fairly simple concept including components of effectiveness and efficiency that are mainly related to extrinsic motivation in work contexts. As seen from uses and gratifications studies, the extrinsic motivations of mobile services are not limited to effectiveness and efficiency. Motivations of accessibility,

flexibility, sociability and security typical of communication (as opposed to information) services have all been mentioned in these studies. In addition, motivations of enjoyment, fashion, and status and expressiveness have been mentioned (Leung and Wei, 1999a, b, 2000; Höflich and Rössler, 2001). Some of these motivations are intrinsic, but other may perhaps best be characterized as derived, meaning that they provide an instrumentality or gratification that was not intended by or anticipated during design, and that perhaps also was not considered or anticipated by the user at the time of the adoption (Pedersen, 2002, Pedersen et al., 2002, Anderson et al., 2002).

Thus, studies suggest that the usefulness concept should be extended and supplemented to cover the issues of intrinsic and derived motivations. For example, *enjoyment and entertainment* go beyond ease of use and usefulness, and are perceived as instrumental of services primarily designed for entertainment (mobile games, mobile video and audio streaming, chat and flirt services) (Leung and Wei, 1999b, 2000). The instrumentality of these services is enjoyment and entertainment in itself, not the efficiency or effectiveness of being able to access mobile entertainment services ubiquitously. This indicates that enjoyment should be included in adoption models developed for users of mobile services as a separate concept contributing both to perceptions of usefulness, ease of use and attitudes towards use.

In CMC-research, *expressiveness* is compared to instrumentality as two styles of communication (Boneva, et al. 2001). Expressiveness is used of communication in relationships of emotional intimacy and sharing, while instrumentality is used of

communication in relationships based on common activities. For example, Boneva et al. (2001) believes female communication to be more expressive, whereas male communication is believed to be more instrumental. Based on these assumptions, services that communicate expressiveness in this form are more likely to be appreciated by female users. In social psychology, recent contributions have suggested replacing the well known concept of self-identity as a determinant of intended behavior with self-expression (Mannetti et al., 2002). The research on the influence of self-identity on intended behavior is however, still relevant. Typically, the relationship between behavior and self-identity is given a social interpretation based upon Mead's and Goffman's theories of the social construction of the self (Mead, 1934, Goffman, 1959), a structuration interpretation based upon Giddens's theories (Giddens, 1991), or a role-oriented personality interpretation. In the first case, self-identity is the result of social identification, in the second case it is the results of the interaction of social identity and repeated actions maintaining a "personal biography", and in the final case it is a more rational frame of reference for behavioral decisions. When applying the term expressiveness we focus the importance of behavior as something that may be interpreted by others in the social construction of identity and by oneself in the repeated self-construction of identity. Thus, expressiveness is a more operational concept applied to the use of technologies or services or the consumption of products and services that are important to both social identity and role-oriented self-identity. Consistent with this conception of expressiveness, consumer psychology characterizes value-expressive products as expressing the consumer's identity both in social networks and to oneself. We suggest that expressiveness in terms of both the social expression of identity and self-identification

are important elements in the adoption and use of mobile services. Expressiveness is an instrumental attribute of a communication service partly influencing usefulness and partly influencing attitudes directly. For information services, expressiveness is an unanticipated service characteristic. Thus, we expect that expressiveness is more relevant when explaining the adoption of communication services than information services.

Attitudes are generally believed to be the results of personal and social influences.

However, in the technology acceptance model (TAM), attitudes towards use are determined by personal influences only. When including subjective norm in the model, it is possible to create a relationship between norms and attitudes that may be particularly relevant to young users' adoption of mobile services. However, it is also important to conceptually discriminate norms and attitudes in adoption models. Thus, we suggest accepting an influence of subjective norm on attitudes, but reject including influences of external and interpersonal influence on attitudes directly. We also suggest extending the determinants of attitudes towards use from purely instrumental determinants to more derived determinants such as enjoyment and expressiveness. However, the attitude formation process is believed to be similar for usefulness, ease of use, enjoyment and expressiveness in that the individual sees a service as instrumental in fulfilling intrinsic, extrinsic and derived gratifications, and consequently develops a positive attitude towards using it. The relationship between attitudes and intentions may be different for different service categories. For example, for services that are widespread and well known, it is easy to obtain information on other users' experience and also to gain experience from actually using the service oneself. This indicates that for established services,

instrumental and experiential motives are the most important explanations of user intentions. On the other hand, if services are new and unknown, intentions to use services may be based upon general attitudes and less on experientially derived motives.

Subjective norms are developed through external and interpersonal influence. In general, Webster and Trevino (1995) suggest social influences, and thus, subjective norms to be more influential in explaining the adoption and use of new media. The question, however, is which services should be considered new media in the Scandinavian market for mobile services. In an international setting, most mobile services may be considered new media, but in Scandinavia, mobile data services in the form of text messaging is now well integrated in the everyday lives at least of young users. Consequently, even though social motivations for adoption may be important, these motivations may by now be more instrumental than norm based, and should be identified through instrumental determinants of attitude toward use rather than through subjective norm. To give an example, young users may find text messaging instrumental in social coordination because all other members of their social network use it, but still feel little social pressure towards using text messaging services as a norm.

The inclusion of *behavioral control* in TPB has been an important contributor to its explanatory power. In general, we argue that the determinants of behavioral control are believed to be less important to young and innovative users than other users because of their experience and skill in using mobile services and the providers' facilitation of mobile services such as text messaging services to the young user segment. Financial

resources and pricing, however, are indirectly believed to be important determinants of behavioral control due to both limited resources among young users and recent findings that these users are more price sensitive than previously assumed (Karlsen et al., 2001). Behavioral control is a general term composed of elements of individual traits and perceptions of operators' and providers' facilitation. It is also likely that the influence of behavioral control will vary across mobile services. In general, we suggest that the influence of self-efficacy on behavioral control is greatest for complex, new, integrated, expensive and terminal demanding services. The same may thus be argued of the influence of behavioral control on intention to use these services. For example, the adoption of technically complex services, services requiring advanced terminals, services with hidden costs, and generally expensive services will be more influenced by behavioral control than simple and cost efficient services. On the other hand, behavioral control will be more relevant to the less skilled and price sensitive user than to the innovative and price insensitive users. Given that new mobile data services are first adopted by innovative users, the adoption of mobile parking services is *currently* less influenced by behavioral control.

Methodology

To investigate the motivational, attitudinal, social and resource-based influences on the intention to use mobile parking services, a survey of new mobile parking services users was designed. The survey was designed as a simple one-group posttest design. A quasiexperimental setting was applied by selecting respondents in the population that had recently signed up for a free test trial of the service or who had recently signed up for a

full membership. Of the two categories, the vast majority of respondents were in the first category. The trial service was announced using large posters at major parking areas including individual folders explaining how users could phone or SMS the provider to obtain a free one hour parking service. A total of 2550 respondents were identified in the population, and a list of these users was used as a sample frame.

Subjects were given the opportunity to visit a web-site to answer the questionnaire online, or use a pre-paid postal version attached to the introductory letter and procedure material. 47 subjects chose to answer the questionnaire online and 418 offline using the postal alternative. Thus, a total of 465 questionnaires were returned. Six of the questionnaires were excluded from the analysis due to late arrival. The final response rate obtained was 18.2%. Sample demographics of the mobile parking service subjects are shown in table 1.

Insert table 1 here.

The sample included a larger proportion of men than women, a larger proportion of subjects with university education and a larger proportion of subjects with higher level income when compared to the general Norwegian population. However, these differences are not very large and the differences in the distributions are according to what one may expect of new users of a mobile parking service. Thus, we assume that the sample demographics correspond well to the population demographics of new mobile parking service adopters.

The model suggested in section 2 includes 8 concepts: Ease of use, usefulness, expressiveness, enjoyment, attitudes towards use, subjective norm, behavioral control and intention to use. Most of these concepts are well founded in adoption, uses and gratification, or domestication research literature. Consequently, the construct validity of these concepts is in general considered acceptable. To measure the concepts, a questionnaire was designed containing multiple measures of each of the 8 concepts. In general, the concepts were measured by the subjects indicating their agreement with a set of statements using a seven-point scale ranging from "strongly disagree" to "strongly agree". Some concepts were measured using seven-point scales of bipolar adjectives. For each measure, the items were adapted to the mobile parking service context of the study. The measures were investigated for reliability with the lowest values of Cronbach's α of 0.71 and 0.77 and an average value of 0.86.

Ease of use was measured using four items developed from adapting the original items of Davis et al. (1989) to our setting. Similar operations are found also in Taylor and Todd (1995) and in Battacherjee (2000). Usefulness was measured using three items covering the original dimensions of time saving, improvement, usefulness and quality suggested by Davis (1989). Attitude towards use was measured using four bipolar adjectives indicating different aspects of the subjects' attitude towards use. The items were very similar to those used by Davis (1989), Taylor and Todd (1995) and Battacherjee (2000). The enjoyment concept was defined as incorporating a group of gratifications identified

in studies of the Internet as "enjoyment" (Pappacharissi and Rubin, 2000), of ICQ as "entertainment" (Leung, 2001), of mobile phones as "relaxation" (Leung and Wei, 2000), of pagers as "fun-seeking" (Leung and Wei, 1999b), and of text messaging as "nutz-spaz" (Höfflich and Rössler, 2001). To cover these elements of enjoyment, a four item scale was developed collecting items from uses and gratification scales. The first of the item covered the "entertainment" conception, the second the "relaxation" conception, the third item covered the "excitement" conception also found in studies of video-game and TV-gratifications (Sherry et al., 2001). The final item was a general item covering the "fun-seeking" gratification. The wording of each item was taken from uses and gratifications studies reviewed above.

The choice of a particular concept - "expressiveness" - as a perceived attribute of a service or technology is unique in our model. The term has been used in social psychology of individuals' general ability to express their emotions or identity. For example, in family relationship studies it is used as a measure of how well emotions are expressed by parents and children and how this influences family relationships (Cassidy et al., 1992). In research on identity formation and personality, it is used as a measure of the relationship between what a person believes about herself (what her potentialities are, see Schwartz et al., 2000, p. 507), and how she expresses herself, using the concept of "personality expressiveness" (Waterman, 1993). In this line of research, a person expresses herself through activities, and expressiveness is measured by subjects indicating how important these activities are in expressing their identity. In social psychological research on the prediction of behavior it is closely related to self-identity

which has been found to be a significant predictor of intention to perform specific behaviors (Sparks and Guthrie, 1998). In this literature, self-identity is typically measured using statements challenging the relationship between behavior and the subjects' perceptions of their own personality. In consumer research, the expressiveness concept has been extended from individuals to products indicating how well a product expresses values beyond instrumental utility (Mittal, 1994). Thus, value-expressive products are seen as expressing the consumer's identity. While the expressiveness concept in consumer research covers gratifications of prestige, fashion, pride and mood stimulation, it primarily focuses issues of how products are used to "express my personality" and are "compatible with how I like to think of myself" (Mittal, 1994, p. 258). Thus, items measuring these conceptions of expressiveness have been included. In addition, expressive gratifications have been identified in uses and gratifications research. For example, Arnett (1995) included "identity formation" as a particular gratification of young users, Leung (2001) included "express affection", "fashion" and "inclusion" as gratifications of ICQ-use, and Leung and Wei (1999b, 2000) included "fashion and status" as a gratification of both pager and mobile phone use. From these studies, a status-related expressiveness item was suggested. Studies of text messaging use have shown how one of the most important ways of expressing ones service use is to discuss the service with others and to share it with others (Larsson, 2000; Grinter and Eldridge, 2001; Kaseniemi and Rautiainen, 2002). Thus, items referring to this particular form of expressiveness were included. Similar items, measuring the gratification of sharing technology use with others - social interaction, have been included in studies of video games as well (Sherry et al., 2001) and TV (Lee and Lee, 1995). This element in

expressiveness is also consistent with social perspectives of self-identity and items covering the social element of expressiveness are also included in our measure. Thus, of the four items used, two were oriented towards self-expressiveness and two were oriented towards social-expressiveness.

Subjective norm was measured using three items almost identical to the items used by Mathieson (1991) and Battacherjee (2000). A somewhat simpler version of the measure was used by Venkatesh and Davis (2000). In addition, a general norm item was included, inspired by sociological research on mobile service use (Skog, 2002). The measure of behavioral control was almost identical to the measure applied by Battacherjee (2000) and Taylor and Todd (1995).

Finally, intention to use was measured by presenting a list of mobile services organized by user context and complexity to the subjects. The subjects were asked to indicate how much they had used and intended to use these services on a 7-point scale ranging from "very little or not at all" to "very much". Intention to use was aggregated over the items presented on the list. To comply more fully with the traditional measures of adoption research, intention to use was also measured with a two item scale adapted from Battacherjee (2000) and Mathieson (1991).

All our traditional measures are based upon previously validated measures (Venkatesh and Morris, 2000), and their reliabilities were considered acceptable. To test the discriminant and convergence validity of the independent variables in our model, the

items of all 6 independent variables were included in a confirmatory factor analysis. The analysis showed minimum crossloadings below 0.34 for all variables indicating acceptable convergence and discriminant validity.

Results

Using the data from the parking services study, the adoption model of section 2 was estimated. The results of this estimation are shown in the adoption model for the mobile parking services illustrated in figure 2.

Insert figure 2 here.

From figure 2, we see that model fit is very good when evaluated by all fit indexes¹. The model explains 61% of the variance in intention to use the parking service. This is generally considered a large proportion of the variance, so the explanatory power of the model is very good.

When investigating model relationships, we first see that intention to use mobile parking is explained by direct instrumentality of usefulness and expressiveness, and by attitudes towards use. The effects of subjective norm and behavioral control are not significant.

¹ We generally employ parsimony adjusted measures of fit only. According to Browne and Cudeck, cited in Arbuckle and Wothke (1999), a RMSEA less than 0.08 is acceptable. According to Bentler, cited in Battacherjee (2000), χ^2/df should be less than 5, preferably less than 2, and all other indexes should be close to 1 (Taylor and Todd, 1995). In general, we apply the rules of $\chi^2/df \leq 2$ or better, $RMSEA < 0.08$ and all other indexes ~ 1 .

This gives a fairly simple model for explaining intention to use mobile parking. The services are used because they are instrumentally useful and are considered as a way of expressing oneself that is consistent with the users' idea of themselves. One should be careful in comparing the influences by standardized coefficients, but expressiveness is a very important determinant of intention to use mobile parking services. This is rather surprising given the instrumental orientation of the service. In addition attitudes towards use are significant at the 5% level. Furthermore, attitudes are influenced by usefulness and ease of use only. Thus, attitudes seem to be mainly influenced by traditional utilitarian instrumentality. Usefulness on the other hand is significantly influenced by ease of use and expressiveness. Thus, enjoyment plays no direct or indirect role in the adoption of mobile parking services. On the other hand, the derived motivations of expressiveness play both an indirect and an important direct role.

From these observations we conclude that users' intentions are simply explained by the direct motivational influence of usefulness and expressiveness and by attitudes towards use. Even though the processes influencing the social and resource-based variables may be fairly complex, these variables themselves do not seem to play any significant role in explaining behavioral intentions.

Discussion

In section 2, a model of mobile data services adoption was suggested based upon the theory of planned behavior and modified and re-specified using findings of mobile service end-user behavior in uses and gratifications and domestication research. The

model included four primary influences of adopters' intention to use mobile services. The motivational influence included intrinsic, extrinsic and derived motivations for using mobile services. The attitudinal influence stemmed from motivational determinants and social norms. The last two influences were social, represented by subjective norm, and resource-based, represented by behavioral control.

This model was tested with empirical data on users' adoption and intention to adopt mobile parking services. These services were selected for their focus on instrumental gratifications primarily believed to meet users' extrinsic motivations for using mobile data services. Data from 459 users having tried mobile parking services was used to estimate the model. The general results showed that usefulness, expressiveness and attitudes towards use explained the trial users' intentions to use mobile parking services, that attitudes towards use of these services were determined by ease of use and usefulness, and that usefulness was determined by ease of use and expressiveness. Thus, expressiveness showed a far more important role in influencing the adoption of mobile parking services than what was expected of an instrumentally oriented mobile data service primarily believed to be adopted for utilitarian reasons.

When looking at the social and resource-based influences, neither subjective norm nor behavioral control was found to significantly influence intention to use mobile parking services. As proposed in section 2, lack of influence from subjective norm may partly be explained by the instrumentality of the service and partly by the innovativeness of the subjects. The lack of influence from behavioral control was somewhat surprising given

that mobile parking services are generally considered pricey and complex services relying on a well-functioning underlying infrastructure. However, the simplicity of the services may have been revealed through trial user experience, and these innovative users may also be less price-sensitive than average mobile data services users.

The study was based on the developed procedures, measures and results of five previous studies of mobile service adoption. Thus, we propose that the theoretical and methodological foundations for acceptable internal and external validity are sufficient. In general, all theoretical concepts have been discussed in section 2 and 3 or in previous work (Pedersen, 2001, 2002, Pedersen et al., 2002), and are well founded in adoption, uses and gratifications and domestication. Thus, the construct validity is considered acceptable. Furthermore, analyses of measurement items showed that measures were reliable and that constructs had acceptable convergence and discriminant validity. However, there are still issues of relevance to the internal and external validity of this particular study that requires further discussion.

With respect to internal validity, the procedure used to recruit subjects in this study may have resulted in subjects with a more positive attitude towards the service than the population of trial users. To obtain respondents with some experience of the services, we only recruited subjects participating in a user trial. Thus, our first validity issue is if the results generalize to other potential users of the mobile parking services. Even though we may have recruited subjects with positive attitudes, many of the comments found in the survey questionnaire were also negative, and an equally important motivation for

participating in the survey may have been to express bad experiences from using the trial services. Thus, we assume the recruitment and experimental procedures did not make the sample systematically different from the sampling frame representing the population of trial users. Another advantage of the procedure was that it provided a large sample of trial users further reducing the threat of self-selection to internal validity.

The issue of external validity may be discussed with reference to subject-, setting- and time-specific threats. Even though we argue that internal validity was not threatened by the self-selection procedure applied to recruit subjects, external validity may have been. Thus, one should be careful in generalizing our findings to users not having tried mobile parking services. For example, consumers with no experience in trying this kind of service may perceive service characteristics as different and their intention to use mobile parking services may be based upon different judgments. As indicated above, it is not unlikely that these subjects will be more influenced by social pressure and perceive their behavioral control as more relevant to service adoption. Still, users are not likely to adopt these kinds of services without some initial trial, making our findings externally valid anyway. In a recent survey of mobile users versus shoppers in Finland, Germany and Greece, Vrechopoulos et al. (2002) found few demographic differences between the two user categories in the three countries. However, mobile shoppers were less focused on price and more on ease of use than mobile users but these differences were not consistent across countries. Thus the findings may indicate that the early adopters of mobile data services and adopters of traditional mobile services are not that different. Another issue with respect to the subjects recruited is the skewed distributions of demographic variables

such as age, gender and income. However, we have investigated model differences and perception differences by age, gender and income. Some differences were revealed between different demographic segments, but the model proved remarkably stable across segments. Further documentation of model stability is found in Pedersen and Nysveen (2002).

Another issue threatening external validity is the stimulus context used in this study. One may suggest that the mobile parking services investigated in this study are unique in some way that makes our results less valid to the adoption of other mobile parking services or other instrumentally oriented mobile data services. Furthermore, one may argue that the free trial campaign used as a basis for recruiting subjects in this study is unique and thus, the results are only unique to this particular trial setting. With respect to this issue, the free trial period was limited to one hour free parking. It is not likely that this has generated any situation specific threats to external validity. Besides, it is not likely that this affected our findings of usefulness and expressiveness as determinants of intentions to use the services in any particular way that threaten the external validity of the setting. The mobile parking services investigated are a fairly simple and general mobile parking services, and most other mobile parking services are very similar. Generalizing our findings to other instrumental mobile data services, is however, another issue. We argue that the selection of mobile parking services represents a “crucial test” of the external validity of our TPB-model extensions (intrinsic and derived motivations of enjoyment and expressiveness). We argue when finding expressiveness to be influential in the adoption of this service, we may well generalize this to most other instrumental

data services. Thus, we conclude that our finding of expressiveness as influential in the adoption of mobile parking services makes it very likely that expressiveness is a unique gratification of most mobile data services, and that developers should take this adoption determinant into consideration when designing and marketing their services. There were no particular media events, campaigns (other than the free trial campaign) or service defects during the trial and data collection period of the study. Consequently, time has not threatened the external validity of our results during the study. Still, our findings should be interpreted with care because more attention was given to internal than to external validity in the design of the study.

For researchers, the results of this study provide a “crucial test” of non-instrumental influences on the adoption of instrumental mobile services. Given this setting, it is surprising to see such a consistent influence of expressiveness. This indicates that the motivational process of adoption is more complex than previously assumed suggesting this process should be further elaborated on. For example, the relationship among intrinsic, extrinsic and derived motivations requires further analysis. For mobile parking services in particular, the influences of the self-identity elements of expressiveness is particularly interesting. In applied social psychology and consumer psychology, the element of self-identity in consumption has been given some attention (Mannetti et al., 2002, Sparks and Guthrie, 1998). Self-identity in many of these contributions is seen somewhat different from the socially constructed self-identity of Mead and Goffman (Mead, 1934, Goffman, 1959) and in the structuration theory of Giddens (1991). This line of research has mainly been applied to the consumption of value expressive products

(Mittal, 1994) such as objects of display or style and products related to personal lifestyles, such as environmentally relevant products (Cook et al., 2002). In IS-research, these concepts have been given little attention. Instead, symbolic elements of media choice and use have been investigated in this tradition, focusing more on the symbolic effects of using specific technologies and services rather than their role in the development and expression of users' self-identity. As mobile services are introduced in work contexts, the influences of social-identity and self-identity in the process of adopting these services should be given more attention. Our development of the expressiveness concept, the evaluation of the validity and reliability of the concept, and the demonstration of its influence on the intention to adopt these instrumental mobile parking services represent significant contributions to this research.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organization Behavior and Human Decision Processes*, 50, 179-211.
- Anderson, B., Gale, C., Gower, A.P., France, E.F., Jones M.L.R., Lacohee, H.V., McWilliam, A., Tracey, K. and Trimby, M. (2002). Digital Living – people centered innovation and strategy. *BT Technology Journal*, 20: 11-29.
- Arbuckle, J.L. and Wohtke, W. (1999). *Amos 4.0 User's guide*. SmallWaters Corp., Chicago, IL.
- Arnett, J. (1995). Adolescents' uses of media for self-socialization. *Journal of Youth and Adolescence*, 24, 519-531.
- Battacherjee, A. (2000). Acceptance of e-commerce services: the case of electronic brokerages. *IEEE Transactions on Systems, Man and Cybernetics*, 30, 411-420.
- Boneva, B. Kraut, R. and Frohlich, D. (2001). Using E-mail for Personal Relationships: The Difference Gender Makes. *American Behavioral Scientist*, 45, 530-549.
- Cassidy, J., Parke, R.D., Butkovsky, L. and Braungart, J.M. (1992). Family-peer connections - the roles of emotional expressiveness within the family and childrens understanding of emotions. *Child Development*, 63, 603-618.
- Cook, A.J., Kerr, G.N. and Moore, K. (2002). Attitudes and intentions towards purchasing GM food. *Journal of Economic Psychology*, 23: 557-572.
- Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13, 319-340.

- Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35, 982-1002.
- Giddens, A. (1991). *Modernity and self-identity: self and society in the late modern age*. Basic Books, New York.
- Goffman, E. (1959). *The presentation of self in everyday life*. Doubleday, Garden City, NY.
- Grinter, R.E. and Eldridge, M. (2001). Y do tngrs luv 2 txt msg? In Prinz, M., Jarke, Y., Schmidt, K. and Wilf, V. (eds.). *Proceedings of the Seventh European Conference on Computer-Supported Cooperative Work ECSCW'01*, pp. 219-238. Kluwer Academic Publishers, Dordrecht.
- Hunter, L. and Kalafatis, S.P. (2001). *Nirvana on the Web – Do Business Users Experience Flow When Using the Internet*. Presented at EMAC, Rotterdam, Netherlands.
- Höflich J.R. and Rössler, P. (2001). Mobile schriftliche Kommunikation oder: E-Mail für das Handy. *Medien & Kommunikationswissenschaft*, 49, 437-461.
- Karlsen, M.A., Helgemo, I. and Gripsrud, M. (2001). *Useful, cheap and fun: A survey of teenagers demands for mobile telephony*. Research Report, Telenor R&D, Grimstad, Norway.
- Kaseniemi, E. and Rautiainen, P. (2002). Mobile culture of children and teenagers in Finland. In Katz J.E. and Aakhus, M. (eds.). *Perpetual contact*. Cambridge University Press, New York.

- Larsson, C. (2000). *En mobiltelefon är inte bara en mobil telefon*. Magisteruppsats. Göteborgs Universitet, Gotenburg, Sweden.
- Lee, B. and Lee, R.S. (1995). How and why people watch TV: implications for the future of interactive television. *Journal of Advertising Research*, November/ December, 9-18.
- Leung, L. (2001). College student motives for chatting on the ICQ. *New Media & Society*, 3, 483-500.
- Leung L. and Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. *J&MC Quarterly*, 77, 308-320.
- Leung, L. and Wei, R. (1999a). Seeking news via the pager: An expectancy-value study. *Journal of Broadcasting & Electronic Media*, 43, 299-315.
- Leung L. and Wei, R. (1999b). The gratifications of pager use: Sociability, information-seeking, entertainment, utility, and fashion and status. *Telematics and Informatics*, 15, 253-264.
- Mannetti L., Pierro A., and Livi S. (2002). Explaining consumer conduct: From planned to self-expressive behavior. *Journal of Applied Social Psychology*, 32: 1431-1451.
- Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*. 2, 173-191.
- Mead, G.H. (1934). *Mind, self and society: from the standpoint of a social behaviorist*. University of Chicago Press, Chicago.
- Mittal, B. (1994) A study of the concept of affective choice mode for consumer decisions. *Advances in Consumer Research*, 21, 256-263

- Novak, T.P., Hoffman, D. and Yung, Y.F. (2000). Measuring the Customer Experience in Online Environments: A Structural Modeling Approach. *Marketing Science*, Vol. 19, No. 1, pp. 22-42.
- Oksman, V. and Raitiainen, P. (2001). *"Perhaps it is a body part". How the mobile phone became an organic part of the everyday lives of children and teenagers*. Presented at the 15. Nordiska konferensen för medie- ock kommunikationsforskning, Reykjavik, Island, August, 11-13.
- Papacharissi, Z. and Rubin, A.M. (2000). Predictors of Internet use. *Journal of Broadcasting & Electronic Media*, 44, 175-196.
- Pedersen, P.E. (2001). *Adoption of mobile commerce: An exploratory analysis*. SNF-Report 51/01, Institute for Research in Economics and Business Report, Bergen, Norway.
- Pedersen, P.E: (2002). *The adoption of messaging services among Norwegian teens: development and test of an extended adoption model*. SNF-Report 23/02, Institute for Research in Economics and Business Report, Bergen, Norway.
- Pedersen, P.E. and Nysveen, H. (2002). *The adoption of a mobile parking service: instrumentality and expressiveness*. SNF-Working Paper no. 76/02. Foundation for Research in Economics and Business Administration, Bergen, Norway.
- Pedersen, P.E, Nysveen, H. and Thorbjørnsen, H. (2002). *The adoption of mobile services: A cross service study*. SNF-Report 31/02, Institute for Research in Economics and Business Report, Bergen, Norway.

- Schwartz, S.J., Mullis, R.L., Waterman, A.S. and Dunham, R.M. (2000). Ego identity status, identity style, and personal expressiveness. An empirical investigation of three divergent constructs. *Journal of Adolescent Research*, 15, 504-521
- Sherry J., Lucas, K., Rechtsteiner, S. Brooks, C. and Wilson, B. (2001). *Video game use and gratifications as predictors of use and game preference*. Presented at the 51th convention of the International Communication Association, Washington, May 24-28.
- Skog, B. (2002). Mobiles and the Norwegian teen: identity, gender and class. In Katz J.E. and Aakhus, M. (eds.). *Perpetual contact*. Cambridge University Press, New York.
- Sparks P. and Guthrie C.A. (1998). Self-identity and the theory of planned behavior: A useful addition or an unhelpful artifice? *Journal of Applied Social Psychology*. 28: 1393-1410.
- Taylor, A.S. and Harper, R.H.R. (2001a). *The gift of the gab?: a design oriented sociology of young people's use of 'mobilZe!* Working Paper, Digital World Research Centre, University of Surrey, UK.
- Taylor A.S. and Harper, R. (2001b). *Talking activity: young people and mobile phones*. Presented at the CHI 2001 Workshop on mobile communications, March 30- April 5, Seattle, WA.
- Taylor, S. and Todd, P.A. (1995). Understanding information technology usage: a test of competing models. *Information Systems Research*, 6, 144-176.
- Venkatesh V. and Davis, F.D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46, 186-204.

- Venkatesh, V. and Morris, M.G. (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*, 24, 115-139.
- Vrechopoulos, A.P., Constantiou, I.D. and Sideris, I. (2002). *Strategic marketing planning for mobile commerce diffusion and consumer adoption*. Presented at the M-Business 2002, Athens, Greece, July 8-9.
- Waterman, A.S. (1993). *Psychometric properties of the Personally Expressive Activities Questionnaire*. Unpublished manuscript, The College of New Jersey, Ewing.
- Webster J. and Trevino L.K. (1995). Rational and social theories as complementary explanations of communication media choices: Two policy-capturing studies. *Academy of Management Journal*, 38, 1544-1572.

Captions

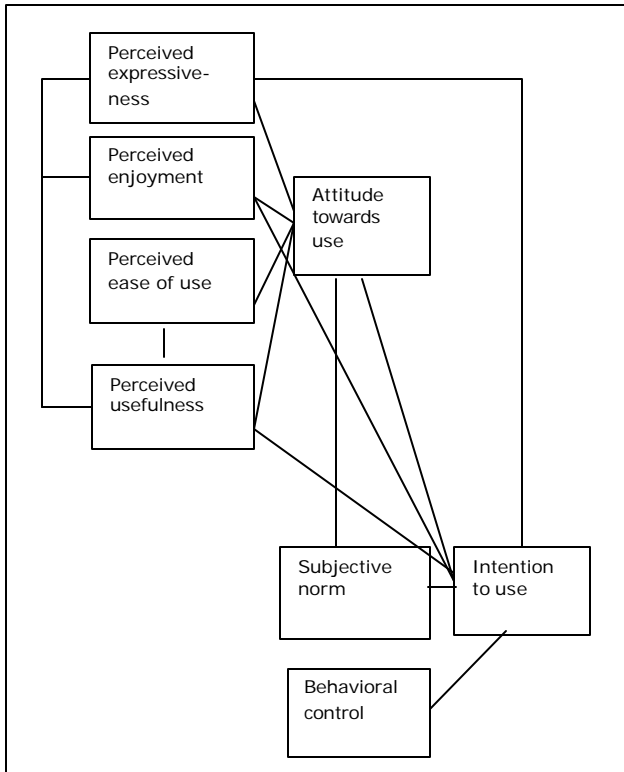


Figure 1 Proposed model of mobile service adoption

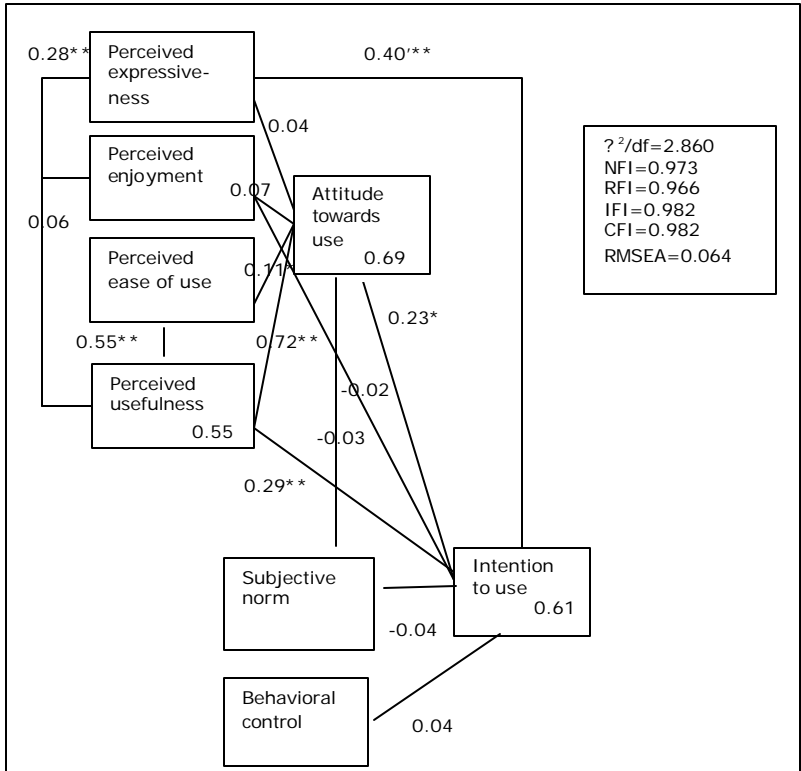


Figure 2 Estimated model of mobile parking services adoption

Table 1 Sample demographics - parking study

Age	N=452	Income (NOK)	N=454
0-19	2.4	<200'	13.7
20-29	24.1	200'-399'	44.9
30-39	33.8	400'-600'	24.4
40-49	23.0	>600'	17.0
50-59	11.3	Sex	N=456
60 and above	5.3	Male	72.1
Education	N=457	Female	27.9
Primary	2.2		
Secondary	23.6		
University <3	37.0		
University >=4	37.2		