

Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons

Pre-print version of paper published in

Journal of the Academy of Marketing Science, 2005, 33(3).

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Category of the article: Consumer and Buyer Behavior

ABSTRACT

This article develops and tests a model to explain consumers' intention to use mobile services. Through triangulating theories from the diverse fields of information systems research, uses and gratification research, and domestication research, the authors put forth an integrated model that explains intention to use mobile services. The model proposes four overall influences on usage intention: motivational influences, attitudinal influences, normative pressure, and perceived control. The authors study the type of interactivity (person-interactive service versus machine-interactive service) and process characteristics associated with the service (goal-directed service versus experiential service) that moderate the effects on the relationship between the proposed antecedents and usage intention. The results from empirical studies of four mobile services show strong support for the effects of motivational influences (i.e., expressiveness, enjoyment, ease of use, and usefulness), attitudinal influences, normative pressure, and perceived control on consumers' intentions to use mobile services. Some of the effects are moderated by process characteristics (goal-directed versus experiential services) that are associated with the service.

Understanding how companies should interact with their customers and deliver services in electronic environments is of decisive importance (Parasuraman and Zinkhan 2002).

Consumers' use of mobile communication devices is increasing rapidly, and devices based on mobile technology are now commonplace in everyday life (Balasubramanian, Peterson, and Jarvenpaa 2002). Mobile services are becoming increasingly important for firms and consumers because of ubiquitous, universal, and unison access to information and services and the possibility for unique and personalized exchange of information (Watson, Pitt, Berthon, and Zinkhan 2002). Despite these advantages, consumers use mobile devices mainly for simple services, such as voice services and text messaging. It is important to understand the driving forces of consumers' intentions to use mobile services and to adapt the services to fulfill consumers' motives for using them.

Within the information system perspective, studies pertaining to consumers' intentions to use mobile services have been conducted on the basis of Davis's (1989) technology acceptance model (TAM) (Hung, Ku, and Chang 2003). Although the TAM is very useful in explaining behavioral intention, several extensions of the model may be relevant to explain intention to use mobile services. First, it has been suggested that, in general, TAM may be too parsimonious and that it should be supplemented and extended by means of concepts such as subjective norm and image (Venkatesh and Davis 2000). This recommendation is followed by Hung, Ku, and Chang (2003) and Teo and Pok (2003), who propose subjective norm, adapted from the theory of reasoned action (TRA) (Fishbein and Ajzen 1975), as an antecedent on consumers' intentions to use mobile services. Second, TAM is most often used in a work-related context that does not imply any costs for the user. In contrast, consumers who use mobile services are usually charged by both the company offering the service and their mobile operator. Thus, consumers' use of mobile services also depends on their available resources

(perceived control), as predicted in the theory of planned behavior (TPB) (Ajzen 1991). Third, because the TAM is most often used in an organizational context rather than in an everyday life context for mobile services, it is reasonable to include nonutilitarian motives to explain consumers' intentions to use mobile services. Consumers' nonutilitarian motives (e.g., expressiveness, enjoyment) for using mobile devices are reported in studies from uses and gratifications research (Höflich and Rössler 2001; Leung and Wei 2000). The effect of expressiveness is further supported in studies from domestication research (Ling 2001; Skog 2002). The studies indicate that use of mobile services is motivated by expression of style, image, fashion, and symbolic capital. Fourth, the TAM's ability to explain intention to use various forms of technology is limited, and explained variance is typically approximately 40% (Venkatesh and Davis 2000). An integration of various theoretical perspectives may provide a richer understanding of the mobile services phenomenon (Konana and Balasubramanian 2004). Consequently, to explain consumers' intentions to use mobile services, we combine theories from organizational contexts (information systems theories) with theories that explain technology usage in everyday life (uses and gratification theory and domestication theory).

In this article we study the use of mobile services such as text messaging, gaming, contact, and payment. Mobile services have several different characteristics. According to Hoffman and Novak's (1996) categorization, text messaging services and contact services represent person-to-person interactive services, whereas gaming services and payment services are machine interactive. Furthermore, text messaging and payment can be characterized as goal-directed services, whereas gaming services and contact services are more experiential. Because of the differences in mobile services' characteristics, consumers' motives for using them differ across service categories. Therefore, the antecedents of customers' intentions to use mobile services should be studied across service categories.

The purpose of this article is twofold. First, to develop a model that explains customers' intentions to use mobile services based on information system research, uses and gratification research, and domestication research. Second, to investigate the validity and differential predictive power of the model across four different categories of mobile services: text messaging, gaming, contact, and payment. Consequently, the article has two main contributions. First, our model is based on an integration of various theoretical fields that focus on consumers' motives for using mobile services, thus capturing a broader and more holistic understanding of the antecedents of consumers' intentions to use mobile services than existing research. Furthermore, most studies of the antecedents of mobile services usage have not specified the mobile service studied. Through a cross-study comparison, we provide a more nuanced understanding of consumers' motives for using mobile services.

The remainder of the article is organized as follows: In the following section, we present three theoretical traditions that contribute to the understanding of customers' intentions to use mobile services. We then test the resultant model using data from four surveys of consumers' intentions to use mobile services. Finally, we compare and contrast the studies' findings and discuss the implications for research and practice.

THEORETICAL PERSPECTIVES

Information Systems Research

Behavioral intention is often predicted on the basis of multiattribute models (Fishbein and Ajzen 1975). Such models focus on users' beliefs about multiple attributes of a technology. The TAM (Davis 1989) is a multiattribute model that predicts users' intentions to use a technology based on their perceptions of the user-friendliness and usefulness of the system.

The TAM includes five concepts: perceived ease of use, perceived usefulness, attitudes toward use, intention to use, and actual use. Davis (1989:320) defines perceived ease of use (user-friendliness) as “the degree to which a person believes that using a particular system would be free of efforts”. Davis (1989:320) also defines perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Furthermore, Fishbein and Ajzen (1975:216) define attitude toward use as “an individual’s positive or negative feelings (evaluative affect) about performing the target behavior”. Intention to use is based on Fishbein and Ajzen’s (1975:288) definition of behavioral intention: “the strength of one’s intention to perform a specified behavior”. Although the TAM is applied mainly to explain intention to use technology in organizations, the constructs of the model are fairly general (Doll, Hendrickson, and Deng 1998), and constructs such as ease of use and attitude toward use are also deployed in models that explain use of self-service technology in the context of everyday life (Dabholkar and Bagozzi 2002). In the TAM, user-friendliness is treated primarily as an antecedent for perceived usefulness and attitude toward use, where perceived usefulness is postulated to have a direct effect on intention to use as well as on attitude toward use. In accordance with TAM, we also propose that attitude influences behavioral intention and that behavioral intention influences actual behavior.

Several studies have emphasized the importance of social influences on media use in general (e.g., Venkatesh and Davis 2000). A model that is often used to explain behavioral intention is the TRA (Fishbein and Ajzen 1975). The TRA model includes four general concepts: behavioral attitudes, normative pressure (subjective norm), usage intention, and actual use. The inclusion of normative pressure represents an important addition to the model, and it is often included in the TAM to fill the gap related to the effects of social influence. Normative

pressure, or subjective norm as it is called in Fishbein and Ajzen's (1975:302) original model, is defined as "the person's perception that most people who are important to him think he should or should not perform the behavior in question." The TRA is also used as a basis for modifying the TAM model with normative pressure in studies on antecedents of consumers' intentions to use mobile services (Hung, Ku, and Chang 2003; Teo and Pok 2003). According to the TRA, normative pressure has a direct effect on behavioral intention.

Another characteristic that differs in the use of technology in an organizational context and the use of mobile services in an everyday life context is that users themselves are charged for the service. The TPB was proposed as an extension of the TRA to account for conditions in which people do not have complete control over their behavior (Ajzen 1991). Ajzen (1991:183) defines perceived control as "people's perception of the ease or difficulty of performing the behavior of interest". Perceived control reflects the internal and external constraints on behavior. Examples of such constraints are the individual user's economy and the user's experience and skill with the service. Perceived control is directly related to behavioral intention.

Uses and Gratification Research

Most studies based on the information systems perspectives are conducted in an organizational context in which the main purposes for using the systems are effectiveness, efficiency, and utility. Thus, when the purpose is to explore intention to use mobile services in the context of everyday life, the information systems perspective must be supplemented by other theories that encompass both nonutilitarian motives and utilitarian motives for use. Uses and gratifications research has its foundation in communications research, which constitutes an integrated field of researchers in media, sociology, and social psychology (Katz and

Blumler 1974). Because uses and gratifications research focuses on the individual user in everyday life, the general idea is that users seek gratifications in media and technology use based on their individual "needs" or "motivations" (Lin 1996). As such, uses and gratifications research has an instrumental foundation that not only is similar to rational or utilitarian theories of explaining behavioral intention but also encompasses nonutilitarian motives.

From uses and gratifications studies (Leung and Wei 2000; Höflich and Rössler 2000), several utilitarian motives related to usefulness and ease of use are revealed. We also identify nonutilitarian gratifications that are related to (1) enjoyment, fun seeking, and entertainment and (2) fashion, status, and sociability. Thus, in addition to the traditional antecedents of behavioral intention included in TAM, TRA, and TPB, uses and gratification research indicates that enjoyment, fun seeking, and entertainment are significant motivations for using mobile services. Igarria, Parasuraman, and Baroudi (1996:129) define enjoyment as the intrinsic reward derived through the use of the technology or service studied. Enjoyment and fun are also revealed to be significant antecedents of attitude toward using technology-based self-services (Dabholkar and Bagozzi 2002) and willingness to recommend services (Johnson, Zinkhan, and Ayala 1998).

Domestication Research

Domestication research is dominated by social science researchers, and its reference disciplines are sociology, anthropology, and ethnology. Domestication research has long studied the use of technology in everyday life (Silverstone and Hirsch 1992). Studies often describe the process in which the use of technology becomes an integrated part of everyday life. Gratifications that users receive from using mobile services are in the area of fashion,

status, and sociability (Leung and Wei 2000; Höflich and Rössler 2000). The importance of these gratifications indicates that the use of mobile services may be a way to express personality, status, and image in a public context. We define expressiveness as the degree to which users of mobile services perceive the services as suitable for expressing their emotions and social or personal identity. Expressiveness can be seen as people's perception of a mobile service's ability to express both social and personal identity dimensions (Stryker and Burke 2000). According to Mittal (1994), expressiveness indicates how well a product expresses values beyond instrumental utility. Studies in domestication research reveal the importance of using mobile devices, for example, to express fashion, style, and individual and group identity (Ling 2001; Skog 2002). Therefore, the importance of expressive elements as drivers of intention to use mobile services is further supported by studies in domestication research.

HYPOTHESES - DIRECT- AND INDIRECT EFFECTS

To study consumers' intentions to use mobile services, we postulate a model that integrates the motives for using mobile services that are revealed in information systems theories, uses and gratification theory, and domestication theory. We separate between motivational and attitudinal influences in the model. This makes it possible to propose individual effects of motivational and attitudinal influences on usage intention and to study effects of the motivational variables mediated through attitude towards use. Thus, the model includes four influences of consumers' intentions to use mobile services. First, *motivational* influences include usefulness, ease of use, enjoyment, and expressiveness. These influences are strongly intertwined and reflect the direct instrumentality of intention to use mobile services. Although the direct effect of beliefs on behavioral intention is not included in the TRA, such effects are theoretically justified in the TAM and other intention models (Bagozzi 1982), and are empirically revealed in several studies (e.g. Venkatesh and Davis 2000). According to the

TAM perceived usefulness can positively influence behavioral intention through reasons of goal achievement or rewards (extrinsic motivation) that are independent of users' attitude toward the behavior (Davis, Bagozzi, and Warshaw 1989). Thus, the usefulness of a service may increase consumers' intentions to use the service because it increases consumers' performance or helps them achieve a goal. In addition to extrinsic motivation, Davis, Bagozzi, and Warshaw (1992) reveal the relevance of intrinsic motivation to explain behavioral intention. Whereas extrinsic motivation is based on achievement of specific goals or rewards, intrinsic motivation refers to the pleasure of doing an activity (e.g., Venkatesh 2000).

Although the effect of ease of use on behavioral intention is proposed to be mediated by attitude toward behavior (e.g., Taylor and Todd 1995), studies have shown that users of technology aim to minimize their behavioral effort (e.g., Venkatesh 2000). As an effect of an intrinsic motivation, the user-friendliness of a service may increase consumers' intentions to use a mobile service even if they do not have a positive attitude toward the service itself. Furthermore, perceived enjoyment of using a mobile service appears to be an important intrinsic motivation for behavioral intention toward mobile services. Direct effects of enjoyment on behavioral intention are also shown in an online shopping context (Koufaris 2002). According to extrinsic motivation, users may express themselves through text messaging because it is an effective channel for expressiveness in a given social setting without having a positive attitude toward using text messaging.

Second, positive effects of *attitude* toward using a technology on behavioral intention are proposed in the TAM, TRA, and TPB. In general, people want to perform behavior that is in accordance with their attitudes (Fishbein and Ajzen 1975). Positive effects of attitude toward a behavior on behavioral intention are empirically shown in several studies. Third, *social influences*, or normative pressures, are postulated to have a direct and positive effect on

intention to use mobile services. This relationship is in line with the TRA and TPB, and the argument for the direct effect on intention is that consumers can use a technology on the basis of social pressure alone (though their attitude toward using the technology can be neutral or negative). As proposed in the TPB, the fourth source of influence on consumers' intentions to use mobile services is *resource related* and pertains to users' perceived control of the service. That is, users may have a positive attitude toward using a mobile service, but because of lack of skills or high costs related to the use of the service, consumers may have a low intention toward using the service. On the basis of these arguments, we suggest the following hypothesis of the direct effects on intention to use mobile services:

Hypothesis 1a: Intention to use mobile services is a function of motivational influences, attitudinal influences, social influences, and resource-related influences.

A main point in multiattribute models such as the TRA is that consumers' evaluation of salient beliefs about a product or service directly affects their overall attitude toward the product or service (Fishbein and Ajzen 1975). Consumers tend to have a positive attitude toward services associated with characteristics that they perceive to be good, and vice versa. The arguments for this can be found in balance theory (Rosenberg 1956), which suggests that "people are psychologically predisposed to achieve and maintain cognitive and affective consistency" (Bagozzi 1982:571). Thus, users' beliefs about a services' usefulness, ease of use, enjoyment, and possibilities for expressiveness should positively influence their attitude toward using the service. Therefore, we propose that usefulness, ease of use, enjoyment, and expressiveness have positive effects on attitude toward using mobile services.

Hypothesis 1b: Attitude toward using mobile services is a function of the following motivational influences: perceived usefulness, perceived ease of use, perceived enjoyment, and perceived expressiveness.

Motivational influences on intention may or may not be mediated by attitudes. The mediating effects of beliefs on intention through attitude are well established in the TAM, TRA, and TPB. The argument for the mediation through attitude is that there is a causal flow among beliefs, attitude, and intention. When consumers are exposed to a mobile service, they first develop beliefs about the service. The beliefs mediate the effect on attitude toward the mobile service, and the attitude mediates the effect on behavioral intention toward the mobile service (Lutz 1977). Although we postulate direct effects of motivational elements on behavioral intention, positively valued behavior will also increase consumers' "affect toward the means to achieving those outcomes" (Davis et al. 1989:987). Thus, although motivational elements have a direct effect on behavioral intention, effects of beliefs on intention may also be mediated by attitude toward using the mobile service.

Hypothesis 1c: Motivational influences on intention to use mobile services are mediated by attitude toward using mobile services.

MOBILE SERVICES

Classifications of services enable marketing managers to use specific strategies to handle related services (Zinkhan and Wallendorf 1985). Services and service technologies have been classified according to a wide array of characteristics (see Lovelock 1983), such as process characteristics, type of interactivity, possibility for transactions, possibility for self-help, and level of customer service available from the service technology (Hoffman and Novak 1996;

Meuter, Ostrom, Roundtree, and Bitner 2000). Based on their relevance in online environments, we applied two dimensions discussed by Hoffman and Novak (1996) to the classification of mobile services: *type of interactivity* (machine interactivity versus person interactivity) and *process characteristics* (goal-directed process versus experiential process). Person interactivity is defined as “interactivity between people that occurs through a medium” (Hoffman and Novak 1996:52-53), whereas machine interactivity is defined as interactivity with the medium in which a “user can participate in modifying the form and content of a mediated environment in real time” (Steuer 1992:84). A goal-directed process is characterized by extrinsic motivation, instrumental orientation, utilitarian benefits, and directed search/choice, whereas an experiential process is characterized by intrinsic motivation, ritualistic orientation, hedonic benefits, and nondirected search and navigational choice (Hoffman and Novak 1996).

To study the moderating effects of interactivity type and process characteristics on the proposed relationships between the antecedents and intention to use mobile services, a cross-service study was utilized. Four mobile services were chosen to ensure variance in service characteristics: text messaging services, contact services, payment services, and gaming services. Of the four services used in the study, text messaging and contact services represent person-interactivity services, and payment and mobile gaming services are characterized as machine-interactivity services. Both contact and mobile gaming services are characterized as experiential services, and text messaging and payment services are characterized as goal-directed services (see Figure 1).

Insert figure 1 here

Text Messaging Services

Text messaging in the form of Short Message Services (SMS) has been one of the most successful mobile services in recent years, and it is used mainly for communication among consumers, or person-interactive communication. Höflich and Rössler (2001) found that instrumentality was the main variable that predicted the use of text messaging services. Thus, consumers' motivations for using text messaging are typically for goal-directed activities, such as coordination of activities in everyday life, or for accessing mobile end-user services. However, Te'eni (2001) suggests that the low channel capacity of text messaging is compensated for by including more affective components in the message. This also leads to an adjustment of message content, such as reduction of content formality, which is typically observed in behavioral studies of text messaging use (Kaseniemi and Rautiainen 2002).

Contact Services

Mobile contact services extend person-interactive text messaging with a platform for sharing messages in a larger social network. This platform may be a form of message display, such as a television screen, Web page, or a WAP page, or it may simply redistribute submitted messages to the mobile devices of the contact service subscribers. Currently, three forms of mobile contact services have been adopted. By far, the most popular form of service is that which includes the television set as a message display area. Most contact services include elements that enable contact without relating to any other subject in particular. Another form of contact services is chat services related to a specific topic. Such services may originate from traditional discussion forums on the Internet, or they may be serviced by a broadcast corporation (radio or television). The final form of contact services is chat services, which redistribute messages in a chat room directly to subscribers' handsets. Chat rooms may be subject related or may be organized by user segments (e.g., gender, age, sexual identity); most

include elements to contact new people with similar interests as the user. Thus, these services are categorized as experiential person-interactive services.

Payment Services

Mobile payment services do not involve dialogue with other people, and they are categorized as machine interactive. The services are offered as a convenient way for customers to pay for products and services, in support of instrumental gratifications. Thus, mobile payment services are classified as goal-directed services. Mobile payment services currently exist in three forms. First, the most common form is payments that use SMS messages and charge a substantial overhead price. Examples of such services are ringtones, logos, and access to entertainment on the Internet. Second, payments that use an electronic purse on the mobile device have gained in popularity and have been used to date mainly as a substitute for SMS-based payments. However, consumers are increasingly using the mobile purse to pay for products and services that have prices exceeding the SMS-based payments. Examples of such services are loading subscribers' prepaid account, mobile gambling, and payments for physical services such as bus, train, and cinema tickets. A third form of mobile payment services is to charge subscribers' telephone bill or use an account-based solution. Depending on when content providers are paid by the operator, this solution represents a credit-based or invoice-based payment mechanism.

Gaming Services

Customers playing games on their mobile telephone interact with the game itself. Thus, mobile gaming services are classified as machine interactive. In their study on use and game preferences, Sherry, Lucas, Rechtsteiner, Brooks, and Wilson (2001) found six different uses and gratifications of video game use: competition, challenge, social interaction, diversion,

fantasy, and arousal. On the basis of this study and related studies, we classified gaming services as experiential services. In addition to preinstalled or operating system-specific installed games, three different standards are currently used for mobile gaming: SMS games, WAP games, and downloadable games, in which Java games are the most important category. To date, SMS-based gaming is the most popular standard for gaming. For example, Virtual Boyfriend/Girlfriend, a game created by Scottish Digital Brides, logs approximately 16,500 text messages daily (*The Economist* 2002). Many of Codeonline's games, such as "Who Wants to Be a Millionaire?" and "Trivial Pursuit," are also available in WAP versions. Other games, such as Tease and Mobilisation, are available only when a WAP browser is used. Java is used as a programming language that enables multiplatform applications to run on Java-enabled mobile devices. These devices allow users to download games in the form of small Java applications (MIDlets) to their telephone, which saves online traffic fees when users play the games. Interactive Java games can be either single-player or multiplayer games.

HYPOTHESES - CROSS-SERVICE COMPARISONS

Although the model (see Figure 2) proposes effects on both attitude toward use and intention to use, behavioral intention toward mobile services is the main dependent variable in the model and, according to the TAM, TRA and TPB, the variable closest to actual behavior. Therefore, in this article, we explain the moderating effects of interactivity (person- versus machine interactivity) and process (goal-directed versus experiential process) characteristics on the relationship between motivational, attitudinal, social, and resource-related antecedents and intention to use mobile services.

Motivational Influences

In the TAM, perceived usefulness is often regarded as a concept that includes components such as effectiveness and efficiency in work contexts. However, as is reflected in uses and gratifications studies, motivations related to perceived usefulness are not limited to effectiveness and efficiency. Motivations also include availability, sociability, reassurance, and instrumentality (Leung and Wei 2000; Höflich and Rössler 2000). In accordance with the TAM, we postulate direct effects of perceived usefulness on intention to use mobile services. As we describe in Figure 1, some mobile services are typically used for goal-directed purposes, and others are used for experiential purposes. As Hoffman and Novak (1996) defined, a goal-directed process is characterized by instrumental orientation with a focus on utilitarian benefits, whereas experiential processes are characterized by ritualistic orientation and hedonic benefits. Because goal-directed services have a relatively stronger weight on utilitarian benefits than do experiential services, we propose that there are stronger direct effects of perceived usefulness on intention to use goal-directed mobile services (in which instrumental orientation and utilitarian benefits are important) than on intention to use experiential mobile services (in which ritualistic orientation and hedonic benefits are more important).

Hypothesis 2a: Perceived usefulness is a stronger motivation for intention to use goal-directed mobile services (text messaging and payment) than for intention to use experiential mobile services (contact and gaming).

Perceived ease of use refers to the degree of effort that consumers associate with using a mobile service (Davis 1989), and it is revealed to influence intention to use mobile services (Hung, Ku, and Chang 2003). When using goal-directed mobile services, consumers are

motivated by utilitarian benefits because of goal fulfillment and/or rewards. According to the TAM (Davis 1989), perceived ease of use positively influences perceived usefulness. That is, only if the mobile services are easy to use are consumers able to take advantage of all possible benefits of the goal-directed services. Thus, perceived ease of use is an important motive for using goal-directed mobile services. Conversely, consumers use experiential mobile services because of the hedonic benefits of the service itself, such as recreation and entertainment (Hoffman and Novak 1996), not by outcomes as rewards. Hoffman and Novak's (1996) flow construct presumes that flow is a function of fit between service challenges and a person's ability to use the service. If the services are too easy to use, customers will become bored because the level of challenge is too low. One of the main points of experiential mobile gaming services is that users want to be challenged and to play "against the service." Therefore, we argue that goal-directed mobile services are more sensitive toward the user-friendliness of a service than are experiential services.

Hypothesis 2b: Perceived ease of use is a stronger motivation for intention to use goal-directed mobile services (text messaging and payment) than for intention to use experiential mobile services (contact and gaming).

Igbaria, Parasuraman, and Baroudi (1996) define perceived enjoyment as a reward derived through the use of the technology or service studied, and it has been shown to influence consumers' use of mobile services in uses and gratification research (Höflich and Rössler 2000). Experiential services are characterized by ritualistic orientation and hedonic benefits derived from the use of the service, whereas goal-directed services are characterized by instrumental orientation and utilitarian benefits related to the use of the service. Motives underlying consumers' experiential behavior are to receive entertainment (Hoffman and

Novak 1996). Thus, perceived enjoyment stands out as an important motive for using experiential mobile services. This indicates that an intrinsic motivational factor, such as perceived enjoyment, has a stronger effect on consumers' intentions to use experiential mobile services than goal-directed services. Thus, we argue the following:

Hypothesis 2c: Perceived enjoyment is a stronger motivation for intention to use experiential mobile services (contact and gaming) than for intention to use goal-directed mobile services (text messaging and payment).

Motives of expressiveness for using mobile services are highlighted particularly in domestication research, which points to the importance of values as fashion and style (Ling 2001) and the use of mobile services as a symbolic capital (Skog 2002). In consumer research, the expressiveness concept has been extended from people to products, which indicates how well a product or service expresses values beyond instrumental utility (Mittal 1994). In general, such an extension indicates that expressiveness is a more important antecedent for intention to use experiential services than are goal-directed mobile services characterized by instrumental orientation and utilitarian benefits. Although both goal-directed and experiential services have been investigated in domestication research studies that stress identity expression through mobile services, the mode of use in which expressiveness is highlighted has been less goal-directed and more experiential. For example, in general, studies that identify advanced forms of expressiveness in the use of SMS language have focused on the use of SMS-based services in experiential modes or contexts rather than in goal-directed contexts (Ling 2004). According to these arguments, the importance of a service in enabling expression of personal identity is more relevant for the intention to use an experiential mobile

service, such as gaming, than for the intention to use a goal-directed service, such as payment.

Thus:

Hypothesis 2d: Perceived expressiveness is a stronger motivation for intention to use experiential mobile services (contact and gaming) than for intention to use goal-directed mobile services (text messaging and payment)

Attitudinal Influences

Attitude toward a behavior refers to consumers' evaluative affect about performing a behavior, and there is extensive support for a positive effect of attitude toward using mobile services on behavioral intention toward mobile services. However, the relationship between attitudes and intentions may differ across categories of mobile services. We base this argument on the categorization of mobile services into person-interactive and machine-interactive services. Machine-interactive services are often used in an anonymous and nonpublic context. Because the interaction is not with other people, consumers can base their usage intention on their own attitude toward using the service. Conversely, person-interactive services are used in a public context in which a person's interaction is observed by other people; thus, the person must adapt to other people's form of communication (e.g., so as not to be excluded from a social network). Therefore, the importance of attitude toward using a mobile service is stronger for machine-interactive services than for person-interactive services. Thus, we propose the following:

Hypothesis 2e: Attitude toward using a mobile service has a stronger effect for intention to use machine-interactive mobile services (gaming and payment) than for intention to use person-interactive mobile services (contact and text messaging).

Social Influences

Normative pressures are norms developed through external and interpersonal influence (Fishbein and Ajzen 1975). The importance of normative pressure on intention to use mobile services is revealed in studies that are based on the information systems perspective (Hung, Ku, and Chang 2003; Teo and Pok 2003). However, we argue that the type of interactivity moderates the effect of normative pressure on intention to use mobile services. As mentioned previously, people use person-interactive mobile services in a public social context in which they observe others' activities and in which they must adapt to others' interaction. The use of machine-interactive services is more anonymous and nonpublic, and such services can be based more on individual preferences than can person-interactive services. Because of the public context associated with the use of person-interactive mobile services, we argue that normative pressure as a driver of using mobile services is more important for person-interactive services than for machine-interactive services.

Hypothesis 2f: Normative pressure is a stronger influence for intention to use person-interactive mobile services (contact and text messaging) than for intention to use machine-interactive mobile services (gaming and payment).

Resource-Related Influences

In general, perceived control is composed of elements of individual constraints that are related to the individual user's economy, experience, and skill in using a service. We argue that there is a moderating effect of process characteristics on the relationship between resource-related factors and intention to use mobile services, based on the skill dimension of consumers' resources. When using goal-directed services, consumers depend on the functionality of the

mobile services. If users believe that they are not in control of the goal-directed service, they may choose to use other channels, for example, to make a payment or to send messages to friends. Conversely, people use experiential services more for hedonic benefits, and thus the consequences of making a mistake as a result of lack of skills when using mobile gaming services are rarely harmful to the user. Indeed, making mistakes because of lack of skills may stimulate further use of the services because the user wants to achieve the “next level.” Therefore, we believe that perceived control is a more important antecedent of intention to use goal-directed mobile services than experiential mobile services.

Hypothesis 2g: Perceived control is a stronger influence for intention to use goal-directed services (payment and text messaging) than for intention to use experiential services (gaming and contact).

METHOD

Design, Procedure, and Sample Characteristics

We conducted four individual surveys to investigate cross-service differences in the proposed model. All surveys were designed as one-group posttest designs. A quasi-experimental setting was applied, and the subjects were given a stimulus text that focused on one of the service categories. For example, in the text messaging survey, the following stimulus text was used: "We now want you to focus on text messaging services that are used in different ways to keep or get in contact with others. Examples of such services are sending text messages to friends and family. Using SMS to receive logos and ringtones is not relevant here."

The text messaging survey was administered by school contacts at three upper secondary schools during a period of three weeks in March 2002. Participants answered the

questionnaire during dedicated class hours, and we attained a response rate of 62.3% (of the number of questionnaires distributed). The contact services survey was announced at 40 online newspaper sites that provided mobile contact services through an ad that was presented at times when the newspapers had "unsold ad space" in the period from July 1 to August 1, 2002. The survey was entirely Web based, and the response rate (measured as the share of people "clicking on" the banner that actually answered the questionnaire) was 43.6%. We removed respondents who took less than 180 seconds on the survey. We conducted the payment services study by including a recruitment text in the SMS account balance service of the prepaid customers of a significant Scandinavian mobile carrier. The text suggested that respondents either visit the study's Web site or reply "contact" by SMS to be contacted by project researchers. For the latter method, project researchers asked for respondents' addresses to mail them the survey questionnaire. The contact-based version of the recruitment method was used for one day, and the Web-based method was used for two days in April 2002. A total of 579 respondents visited the survey Web site, and 320 respondents (55.3%) completed the survey. Of the 313 questionnaires mailed, 175 respondents (55.9%) returned a completed mail version of the survey. The gaming services study was announced through regular posts at 28 international and national Web-based discussion forums for gaming, mobile gaming, and mobile entertainment services. All postings were made to "announcement" and "news topics" in each forum. In addition, the link was implemented at Midletcentral.com. The posts and link resulted in 1030 visits to the survey Web site. A total of 201 (19.5%) respondents completed the survey. Sample demographics of all four studies are shown in Table 1.

Insert table 1 here

As Table 1 shows, there are significant differences in sample demographics among the four surveys. Because of these differences, we controlled for age and gender differences throughout this study.

Measures

The model presented in Figure 2 includes eight concepts, most of which are well founded in information systems, uses and gratification, or domestication research literature. The choice of the expressiveness concept as a perceived attribute of a service or technology is unique in our model. Studies of text messaging use have shown that the most important way to express one's service use is to discuss and share the service with others (e.g. Kaseniemi and Rautiainen 2002). Thus, we included one item that referred to this form of expressiveness in our model. Similar items measuring the gratification of sharing technology use with others, or social interaction, have been included in studies of video games (Sherry et al. 2001). In addition, we included two items that reflected identification with the service and its symbolic use. Similar items have been used in Mittal's (1994) and Leung and Wei's (2000) studies. To address the elements of enjoyment, we developed a four-item scale on the basis of items used in uses and gratification scales. The first item addressed the "entertainment" concept (Leung 2001), the second item the "relaxation" concept (Leung and Wei 2000), and the third item the "excitement" concept, which is also found in studies of video game and television gratifications (Sherry et al. 2001). The fourth item was a general one that addressed fun-seeking gratification (Leung and Wei 1999). We measured usefulness using three items and ease of use using four items that we adapted from Davis et al.'s (1989) original items.

Normative pressure was measured using three items that were almost identical to the items used by Battacherjee (2000). The measure of behavioral control was almost identical to the

measure applied by Battacherjee (2000) and Taylor and Todd (1995). We measured attitude toward use using four bipolar adjectives that indicated different aspects of the subjects' attitude toward use. The items were similar to those used by e.g. Davis (1989). Finally, we measured intention to use using a two-item scale that we adapted from Battacherjee's (2000) study. All items are shown in Table 2.

The subjects indicated their agreement with a set of statements using a seven-point scale that ranged from *strongly disagree* to *strongly agree*. Attitude toward use was measured with seven-point scales of bipolar adjectives. For each study, we adapted the items to the service studied so that the wording of the items referred to different contexts and different purposes of use for each service. However, the wording was kept as similar as possible across studies. Means, standard deviations, and reliabilities of the variables across all four mobile services studied are shown in Table 2. The reliability of behavioral control in the text messaging study was lower than the acceptable .75 limit that Nunnally (1978) suggests. For the other variables, the reliability was acceptable for all four services studied (see Table 2).

To test the discriminant and convergence validity of the variables in our model, we included all items in a factor analysis (principal component) that included eight factors. The analysis showed that the factors explained 82% of the variance in the material (see Table 2).

Insert table 2 here

We find that the convergence validity of the expressiveness scale was somewhat low, with a factor loading of .59 for the first item (see Table 2). This item also has low discriminant validity, with a factor loading of .40 on the intention factor. Thus, to investigate the reliability and validity of our variables further, we applied the procedures that Agarwal and Karahanna

(2000) suggest; we estimated our complete measurement model using AMOS 4. We calculated intervariable correlations, shared variances, and composite reliability, which we illustrate in Table 3.

Insert table 3 here

We show the composite reliability for each variable in Table 3. All values are well above the recommended level of .50 that Hair et al. (1998) suggest. According to Agarwal and Karahanna (2000), all variables should share more variance with their indicators than with other variables. To test this, we show the square root of the average shared variance between items and scale variables on the diagonal of Table 3. Off-diagonal elements are correlations among variables. We find that all variables share more variance with their indicators than with the other variables in the study. Because we calculated these values on the basis of the joined data from the four heterogeneous studies, the results should be considered an indication of the lowest level of reliability and validity of our measurement model. We estimated the measurement model fit for all four studies individually; the results are as follows: for the text messaging study, $\chi^2/df = 2.74$, normed fit index (NFI) = .98, Tucker-Lewis index (TLI) = .99, and root mean square error of approximation (RMSEA) = .05; for the contact service study, $\chi^2/df = 2.65$, NFI = .98, TLI = .99, and RMSEA = .05; for the payment service study, $\chi^2/df = 2.47$, NFI = .98, TLI = .98, and RMSEA = .05; and for the gaming service study, $\chi^2/df = 1.95$, NFI = .96, TLI = .98, and RMSEA = .07. Thus, the fit of the measurement model is considered acceptable.¹ Finally, latent variables should be treated as reflective constructs. Reflective items are “viewed as affected by the same underlying concept,” whereas formative items are “measures that form or cause the creation or change” in the latent variables (Chin 1998:ix). A traditional way to discriminate reflective items from formative items is through

their correlation with variance in the underlying concept. To ensure reflective items, Chin (1998:ix) suggests the following acid test question: “Is it necessarily true that if one of the items (assuming all coded in the same direction) were to suddenly change in a particular direction, the others would change in a similar manner?” When we applied this acid test to our items, we found that all our items were reflective. Furthermore, all our latent variables include measured items, and thus we model all variables as first-order factors.

RESULTS

In the path diagram of Figure 2, we show fit indexes, standardized path coefficients, and explained variances for the suggested model using the data from all four studies. Except for χ^2/df , fit indexes are within acceptable intervals. However, χ^2/df is sensitive to sample size, and thus when all 2038 complete responses are used, the fit indexes NFI, TLI, and RMSEA more correctly reflect model fit (Hair et al. 1998). Thus, we conclude that the model fit is considered acceptable, but the large χ^2/df value indicates that there may be model differences across service categories, as we suggest in Hypotheses 2a–2g. Although the main purpose of this article is to study the structure and importance of antecedents of usage intention, we want to emphasize that the structural model explains 72.3% of the variance in intention to use the investigated mobile services and explains 63.2% of the variance in users’ attitudes toward these services. The observations indicate that the explanatory power of the model is good when compared with previous studies, in particular studies that apply the traditional TAM.

Insert figure 2 here

To control common method bias, the remedies suggested by Podsakoff, MacKenzie, Lee, and Podsakoff (2003) were used. Of the procedural remedies suggested, we combined items with

different response formats (likert and semantic differential items) and used items previously tested and applied in studies of intention to use ICT-based services. Of the statistical remedies, a Harmon one-factor test was conducted. Results from this test suggested the presence of five factors and none of these factors accounted for the majority of the variance. We also applied a test of common method bias suggested by Podsakoff et al. (2003:898) (specific source of common method bias can not be identified). The results revealed that when adding a latent variable reflecting common method, model fit was improved (χ^2 difference = 658.50, $df = 25$, $p < .05$), but the variance accounted for by the common method latent variable was only 10.7% of the total variance. Thus, using results from comparable investigations (Williams, Cote and Buckley, 1989; Carlson and Perrewe, 1999), we concluded that common method bias was not a serious threat to our analysis and tested our hypothesis with the simpler models not including the latent variable reflecting method.

Direct- and indirect effects

As we show in Figure 2, the intention to use mobile services is significantly affected by the direct motivational influence of expressiveness, enjoyment, usefulness, and ease of use as well as by attitudes, normative pressure, and perceived control. These findings support Hypothesis 1a. We also find that the attitude toward using these services is influenced by enjoyment, usefulness, and ease of use, but not by perceived expressiveness. These findings support three of the four parts of Hypothesis 1b. Thus, perceived expressiveness of mobile services has a direct influence on intention to use the services but no indirect influence through attitudes.

To test Hypothesis 1c, which posits that motivational influences are mediated by attitude toward use of services, a traditional model comparison as suggested by Rust, Lee, and Valente

(1995) was applied. For these effects to be mediated by attitude toward use, the more complex model, including the indirect effects of perceived expressiveness, enjoyment, usefulness, and ease of use on attitudes toward use, should show significantly better fit than a simpler model that does not include these effects. The difference in fit between the two models was χ^2 difference = 276.9 (df = 4, $p < .05$), which suggests that we observed a considerable loss in fit by not including the motivational influences mediated by attitudes. This finding strongly supports Hypothesis 1c.

Cross-Service Comparisons

To test our hypotheses of cross-service differences in structural models, we applied group comparison methods for structural equation modeling (SEM) analysis. However, for this method to be applied without control variables, ideally the same respondents should have participated in all four studies. A modification of this requirement suggests that respondents with similar sample characteristics should have participated. As we showed previously, the demographic characteristics of our respondents vary systematically across the four studies. To control for this situation, we applied group comparisons while controlling for age and gender as the most important variables indicating sample differences. The analysis follows the procedures of multigroup SEM that Sujon, Weitz, and Kumar (1994) use. We first investigate whether there are any differences in structural paths between the models for goal-directed and experiential mobile services and between person-interactive and machine-interactive mobile services.² Thus, we investigate the difference in fit between the models with equal structural paths and the models with unconstrained structural paths for the two service categories. We next investigate whether these general differences are consistent when we control for gender and age. If the differences are consistent, we can then test Hypotheses 2a–2g with traditional multigroup analysis. The difference in fit between the constrained and unconstrained

structural path models for the goal-directed versus experiential services was found to be χ^2 difference = 125.5 (df = 12, $p < .05$) for the person-interactive service and χ^2 difference = 95.2 (df = 12, $p < .05$) for the machine-interactive service.³ Thus, we conclude that at least one of the structural paths is different when we compare intention to use goal-directed versus experiential services and person-interactive versus machine-interactive mobile services. When we control for gender and age using a median split multigroup analysis, the differences were χ^2 difference = 64.2 (df = 12, $p < .05$) and χ^2 difference = 73.4 (df = 12, $p < .05$) for the two service categorizations for male subjects, χ^2 difference = 64.7 (df = 12, $p < .05$) and χ^2 difference = 29.3 (df = 12, $p < .05$) for the two service categorizations for female subjects, χ^2 difference = 55.3 (df = 12, $p < .05$) and χ^2 difference = 82.4 (df = 12, $p < .05$) for the two service categorizations for the youngest subjects, and χ^2 difference = 74.9 (df = 12, $p < .05$) and χ^2 difference = 35.3 (df = 12, $p < .05$) for the two service categorizations for the oldest subjects. Separate analyses indicated that both gender and age had significant effects on the difference in structural paths for experiential and person-interactive services, but not for goal-directed and machine-interactive services. However, when we controlled for these effects, we identified differences in structural paths between goal-directed and experiential services and between person-interactive and machine-interactive services. Thus, we conclude that there is at least one structural path that systematically differs between the structural models that explain the intention to use mobile services of different categories, regardless of gender and age differences.

In Hypotheses 2a–2g, we used theoretical arguments for *specific* differences in the influences of intention to use different categories of mobile services. To test these differences, traditional multigroup SEM analysis may be applied because we have revealed that there are systematic

differences in structural path models even when we control for the sample differences in our material. In Table 4, we summarize the results of the multigroup SEM analyses.

Insert table 4 here

As we show in Table 4, five of the seven hypotheses on specific differences in the influences of intention to use different categories of mobile services are supported. We find that ease of use is a stronger motivation for using goal-directed mobile services than for using experiential mobile services, and we find that enjoyment and expressiveness are stronger motivations for using experiential mobile services than for using goal-directed services. We also find that normative pressure is more influential for the intention to use person-interactive services than for the intention to use machine-interactive services, and we find that behavioral control is more influential for goal-directed services than for experiential mobile services. However, we find no support that usefulness is a stronger motivation for using goal-directed services than for using experiential services, and we find that attitudes are more influential for the intention to use person-interactive than for the intention to use machine-interactive services. This is a significant finding in the opposite direction of our proposed hypothesis. In hindsight, we might explain this particular finding on the bases of the level of maturity of the various services. In general, person-interactive mobile services (text messaging and contact services) have been on the market longer than machine-interactive services (gaming and payment services). Consequently, consumers may have had more time to develop attitudes towards person-interactive services, whereas such attitudes have not been sufficiently manifested for machine-interactive services. This may explain why attitudes serve as a more significant driver for intention to use person-interactive services as compared to machine-interactive services. Further research is warranted for explaining this finding.

To control these results for sample differences further, we performed the seven multigroup analyses by controlling for gender and age differences using the median split method that we presented previously. This analysis revealed support for Hypotheses 2c (enjoyment), 2d (expressiveness), and 2g (perceived control), regardless of gender and age. It further revealed moderate support for Hypothesis 2b (ease of use) because the hypothesis was supported for female and older subjects but not for male and younger subjects. Finally, the analysis showed moderate support for Hypothesis 2f (normative pressure) because it was supported for older subjects but not for younger subjects. Consequently, Hypotheses 2c, 2d, and 2g are consistently supported for all gender and age groups, whereas the support for Hypotheses 2b and 2f is moderated by gender and age. However, support for these hypotheses is found in at least one gender or age category.

CONCLUSION

The Model

The traditional antecedents based on the TAM (Davis 1989) - perceived usefulness, perceived ease of use, and attitude toward use - all explain mobile services usage either directly or indirectly. Furthermore, the extensions of the TAM with normative pressure and perceived control also represent important antecedents of consumers' intentions to use mobile services. The most promising and notable effects revealed in this study are those of perceived expressiveness and perceived enjoyment, - two concepts in which partly is adopted from domestication research (Ling 2001) and uses- and gratification research (Höflich and Rössler 2001). These effects emphasize the importance of taking into consideration relatively untraditional antecedents of technology usage when studying intention to use mobile services. The importance of introducing perceived expressiveness and enjoyment in the model is

accentuated when we inspect the incremental increase in explained variance that these concepts entail. Whereas the traditional TAM explains approximately 40% of intention to use various forms of technology (Venkatesh and Davis 2000), our overall model explains 72.3%. All the variables we proposed as antecedents of intention to use mobile services are significant. Consequently, we conclude that there is support for Hypothesis 1a.

The motivational variables explain 63.2% of the attitude toward using mobile services. As the TAM describes, perceived ease of use has both a direct and an indirect (through perceived usefulness) effect on attitude toward using mobile services, and perceived usefulness is a significant antecedent of attitude toward using mobile services. As is shown in studies that explain intention to use self-service technologies (Dabholkar and Bagozzi 2002), perceived enjoyment also positively influences attitude toward using mobile services. However, perceived expressiveness has no effect on attitude toward using mobile services. This indicates that expressiveness influences consumers' intentions to use mobile services for reasons of goal achievement that are independent of their attitude toward using mobile services. The results provide support for three of the four motivational influences that we proposed in Hypothesis 1b.

The results strongly support Hypothesis 1c. Although the antecedents included in the model have direct effects on intention to use mobile services, the effects are also mediated by attitude toward using mobile services. This supports the traditional perspective that posits effects of beliefs on attitude and effects of attitude on intention (Fishbein and Ajzen 1975).

Cross-Service Comparisons

Hypotheses 2a–2g focused on the moderating effects of mobile services based on process characteristics and type of interactivity. When age and gender were not controlled, five of the seven hypotheses proposing moderating effects of service characteristics were supported. Two of the supported hypotheses were moderated by age and/or gender. In general, we conclude that service characteristics moderate the effects of the proposed antecedents of intention to use mobile services. Notably, four of the five hypotheses supported with regard to moderating effects were based on process characteristics rather than type of interactivity. When we controlled for gender and age, three of the seven hypotheses supported were based on arguments regarding process characteristics. Thus, process characteristics (goal-directed versus experiential service) seem to be the most promising theoretical construct of the two we used in this article to explain moderating effects of service characteristics. Furthermore, the effects of age and gender also point to the importance of researchers using not only service characteristics but also user characteristics as potential sources of moderating effects in future studies on drivers of intention to use mobile services.

MANAGERIAL IMPLICATIONS

Our results emphasize several implications for marketing managers with regard to development of mobile services to increase consumers' intentions to use the service. First, the results show a relatively strong overall impact of perceived enjoyment, perceived usefulness and perceived expressiveness on intention to use the services. Perceived enjoyment has a significant and positive effect on intention to use both goal-directed and experiential mobile services, though enjoyment appears to be particularly important as a driver for using experiential services, such as contact and gaming services. The effects of perceived enjoyment on intention to use mobile services are both direct and indirect (that is, mediated through attitude toward use). This finding implies that industry players should pay close

attention to aspects of enjoyment - as excitement and fun - when developing mobile services, especially for experiential services. Perceived usefulness is also a relatively strong predictor of both attitude towards use and intention to use mobile services. Service characteristics did not moderate these effects, indicating that perceived usefulness is a general antecedent for all kinds of mobile services. This particular finding is hardly groundbreaking, but non-the-less tells developers that certain basic threshold levels of usefulness must be present for all mobile services - regardless of their objective - in order for consumers to develop positive attitudes and intention to use the services. Moreover, perceived expressiveness is also revealed to be a significant predictor of intention to use both goal-directed and experiential mobile services. However, the effect is significantly stronger for experiential services than for goal-directed services. The implication of these results is that mobile services should enable users to express their individual and social identity. This is very interesting to note from an industry perspective, as the popularity of mobile services thus may be acutely sensitive to new trends and rapid shifts in fashion and style. If mobile services are important vehicles for expressing style, fashion and social identity (Ling 2001; Skog, 2002), certain services that are “in”, may very fast become “out” if and when the wind of fashion turns. For accommodating consumers’ motives of expressing themselves through mobile services, vendors should put significant resources into developing and delivering services that are timely, up-to-date and personalized according to individual user identities. This is particularly important for experiential services, such as contact services and gaming services, for which expressiveness is a stronger antecedent of intention to use.

Perceived ease of use also showed a direct effect on intention to use mobile services, and an indirect effect mediated through attitudes. It should be noted that ease of use has a somewhat stronger effect on intention to use goal-directed services than on intention to use experiential

services, but this applied only to females and older respondents in our study. Consequently, when promoting goal-directed services to female and/or older respondents, marketers should particularly highlight aspect relating to ease of use and “user-friendliness”. By the same token, developers should ensure, through usability pre-testing, that all mobile services are considered sufficiently easy to use for consumers. This particularly pertains to goal-directed services being used by female and/or older users.

Moreover, in addition to the motivational and attitudinal influences, we also observe that social- and resource-related influences have significant direct effects on intention to use mobile services. Normative pressures are often used to explain the rapid adoption of mobile services, and the results of our study also reveal a significant, albeit fairly moderate, effect of normative pressures on intention to use. We also found the effect of normative pressures on intention to use mobile services to be fairly equal across service categories. This emphasizes the importance of marketers to consider the social context in which the mobile service is used, and the fact that normative pressures exist for both person-interactive and machine-interactive services. By the same token, perceived control is revealed to have a moderate influence on consumers’ intention to use mobile services. We found this variable to be more important for intention to use goal-directed services than experiential services. A possible marketing strategy for increasing consumers’ intention to use mobile services through effects of perceived control could be to offer free use of the service for a period. This would enable potential users to learn the service, thus increasing their perceived control of the service.

According to Meuter et al. (2000), technology-based interaction is a key criterion for the interaction between customers and firms and for companies’ long-term success. The authors also argue that self-service technologies have the potential to create a competitive advantage

for companies that implement such services. In addition, Watson et al. (2002:344) argue for the importance of using mobile services if “organizations are to survive and prosper”. Thus, understanding the mechanisms that drive consumers’ intentions to use mobile services is of vital importance for marketing managers when developing new services and marketing communication campaigns. The results from our study indicate that marketing managers should be aware of motivational variables, such as perceived expressiveness, perceived enjoyment, perceived usefulness, and perceived ease of use, in addition to consumers’ attitude toward use, normative pressure, and behavioral control. In addition, marketing managers should be aware of the sensitivity of service characteristics (type of interactivity and process characteristics) when considering the importance of the antecedents included in our model.

Notes

¹According to Browne and Cudeck (as cited in Arbuckle and Wothke [1999]), a RMSEA less than .08 is acceptable. According to Bentler (as cited in Battacherjee [2000]), χ^2/df should be less than 5. According to Hair et al. (1998), NFI and TFI should be greater than .9.

²The hypothesis tested here is that at least one of the structural paths in the model is different between service categories.

³Note that model fit is now $\chi^2/df = 5.430$, NFI = .98, TLI = .98, and RMSEA = .047 for the least fit unconstrained model; this is due mainly to a smaller sample size that occurred when multigroup analysis was performed.

ACKNOWLEDGMENT

This study is funded by the Norwegian Research Council, Telenor, Den Norske Bank, A-Pressen, Ericsson, and EasyPark. The authors thank the Editor and two anonymous reviewers for their insightful comments on previous versions of this article.

REFERENCES

- Agarwal, Ritu and Elena Karahanna. 2000. "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs about Information Technology Usage." *MIS Quarterly* 24: 665-694.
- Ajzen, Icek. 1991. "The Theory of Planned Behavior." *Organizational Behavior and Human Decision Processes* 50: 179-211.
- Arbuckle, James L. and Werner Wothke. 1999. *Amos 4.0 User's guide*. Chicago: SmallWaters Corp.
- Bagozzi, Richard P. 1982. "A Field Investigation of Causal Relations Among Cognitions, Affect, Intentions, and Behavior." *Journal of Marketing Research* XIX:562-584.
- Balasubramanian, Sridhar, Robert A. Peterson, and Sirkka L. Jarvenpaa. 2002. "Exploring the Implications of M-Commerce for Markets and Marketing." *Journal of the Academy of Marketing Science* 30 (4): 348-361.
- Bhattacharjee, Anol. 2000. "Acceptance of E-commerce Services: The Case of Electronic Brokerages." *IEEE Transactions on Systems, Man and Cybernetics* 30: 411-420.
- Carlson, Dawn, S. and Pamela L. Perrewe. (1999). "The Role of Social Support in the Stressor-Strain Relationship: An Examination of Work-Family Conflict." *Journal of Management* 25: 513-540.
- Chin, Wynne W. (1998). "Issues and Opinion on Structural Equation Modeling." *MIS Quarterly* 22:vii-xvi.
- and Richard P. Bagozzi. 2002. "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): 184-202.
- Davis, Fred D. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology." *MIS Quarterly* 13:319-340.

- , Richard P. Bagozzi, and Paul R. Warshaw. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models." *Management Science* 35:982-1002.
- , Richard P. Bagozzi, and Paul R. Warshaw. 1992. "Extrinsic and Intrinsic Motivation to Use Computers in the Workplace". *Journal of Applied Social Psychology* 22(14):1111-1132.
- Doll, William J., Anthony Hendrickson, and Xiaodong Deng. 1998. "Using Davis's Perceived Usefulness and Ease-of-Use Instruments for Decision Making: A Confirmatory and Multigroup Invariance Analysis." *Decision Sciences* 29:839-869.
- The Economist. 2002. *Fun on the Run; Games on Mobile Phones*, 363 (May 18).
- Fishbein, Martin and Icek Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.
- Hair, Joseph F., Rolph E. Anderson, Ronald L. Tatham, and William C. Black. (1998). *Multivariate Data Analysis*. Upper Saddle River, NJ: Prentice Hall.
- Hoffman, Donna L. and Thomas P. Novak. 1996. "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations." *Journal of Marketing* 60 (July): 50-68.
- Höfllich, Joachim R. and Patrick Rössler. 2001. "Mobile schriftliche Kommunikation oder: E-Mail für das Handy." *Medien & Kommunikationswissenschaft* 49: 437-461.
- Hung, Shin-Yuan, Cheng-Yuan Ku, and Chia-Ming Chang. 2003. "Critical Factors of WAP Services Adoption: An Empirical Study". *Electronic Commerce Research and Applications* 2:42-60.
- Igbaria, Magid, Saroj Parasuraman, and Jack J. Baroudi. 1996. "A Motivational Model of Microcomputer Usage." *Journal of Management Information Systems* 13 (1): 127-143.

- Johnson, Madeline, George M. Zinkhan, and Gail S. Ayala. 1998. "The Impact of Outcome, Competency and Affect on Service Referral." *The Journal of Services Marketing* 12 (5): 397-415.
- Kaseniemi, Eija-Liisa and Pirjo Rautiainen. 2002. "Mobile Culture of Children and Teenagers in Finland." In *Perpetual Contact*. Eds. James E. Katz and Mark Aakhus. New York: Cambridge University Press.
- Katz, Elihu and Jay G. Blumler. 1974. *The Uses of Mass Communications: Current Perspectives on Gratifications Research*. Beverly Hills, CA: Sage.
- Konana, Prabhudev and Sridhar Balasubramanian. 2004. "A Social-Economic-Psychological (SEP) Model of Technology Adoption and Usage: An Application to Online Investing." *Decision Support Systems* forthcoming.
- Koufaris, Marios. 2002. "Applying the Technology Acceptance Model and Flow Theory to Online Consumer Behavior." *Information Systems Research* 13 (2): 205-223.
- Leung, Louis. 2001. "College Student Motives for Chatting on the ICQ." *New Media & Society* 3:483-500.
- and ———. 1999. "The Gratifications of Pager Use: Sociability, Information-seeking, Entertainment, Utility, and Fashion and Status." *Telematics and Informatics* 15:253-264.
- and ———. 2000. "More Than Just Talk on the Move: Uses and Gratifications of the Cellular Phone." *Journalism and Mass Communication Quarterly* 77:308-320.
- Lin, Carolyn A. 1996. "Looking Back: The Contribution of Blumler and Katz's Uses of Mass Communication Research." *Journal of Broadcasting & Electronic Media* 40:574-582.
- Ling, Richard S. 2001. "It is 'in.' It doesn't Matter if You Need It or Not, Just That You Have It: Fashion and the Domestication of the Mobile Telephone Among Teens in Norway." Working Paper, Telenor R&D, Norway.

- Ling, Richard S. 2004. *The Mobile Connection: The Cell Phone's Impact on Society*. New York: Morgan Kaufman.
- Lovelock, Christopher H. 1983. "Classifying Services to Gain Strategic Marketing Insights." *Journal of Marketing* 47 (Summer): 9-20.
- Lutz, Richard J. 1977. "An Experimental Investigation of Causal Relations Among Cognition, Affect, and Behavioral Intention." *Journal of Consumer Research* 3 (March): 197-208.
- Meuter, Matthew L., Amy L. Ostrom, Robert I. Roundtree, and Mary J. Bitner. 2000. "Self-Service Technologies: Understanding Customer Satisfaction with Technology-Based Service Encounters." *Journal of Marketing* 64 (July): 50-64.
- Mittal, Banwari. (1994). "A Study of the Concept of Affective Choice Mode for Consumer Decisions." In *Advances in Consumer Research*. Eds. Chris T. Allen and Deborah Roedder-John. Association for Consumer Research 21:256-263.
- Nunnally, Jum C. (1978). *Psychometric Theory*. New York: McGraw-Hill.
- Parasuraman, A., and George M. Zinkhan. 2002. "Marketing to and Serving Customers Through the Internet: An Overview and Research Agenda." *Journal of the Academy of Marketing Science* 30:286-295.
- Podsakoff, Phillip M., Scott MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff. (2003). "Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies." *Journal of Applied Psychology* 88: 879-903.
- Rosenberg, Milton J. 1956. "Cognitive Structure and Attitudinal Affect." *Journal of Abnormal and Social Psychology* 53:367-372
- Rust, Roland T., Chol Lee, and Ernest Valente Jr. (1995). "Comparing Covariance Structure Models: A General Methodology." *International Journal of Research in Marketing* 12:279-291.

- Sherry, John, Kristen Lucas, Stephany Rechtsteiner, Christi Brooks, and Brooke Wilson. 2001. "Video Game Use and Gratifications as Predictors of Use and Game Preference." Paper presented at the 51th convention of the International Communication Association, Washington (May 24-28).
- Silverstone, Roger and Eric Hirsch. 1992. *Consuming Technologies*. London: Routledge.
- Skog, Berit. 2002. "Mobiles and the Norwegian Teen: Identity, Gender and Class." In *Perpetual Contact*. Eds. James E. Katz and Mark Aakhus. New York: Cambridge University Press.
- Steuer, Jonathan. 1992. "Defining Virtual Reality: Dimensions Determining Telepresence." *Journal of Communications* 42 (4): 73-93.
- Stryker, Sheldon and Peter J. Burke. 2000. "The Past Present and Future of Identity Theory". *Social Psychology Quarterly* 63:284-297.
- Sujan, Harish, Barton A. Weitz, and Nirmalya Kumar. 1994. "Learning Orientation, Working Smart, and Effective Selling." *Journal of Marketing* 58:39-52.
- Taylor, Shirley and Peter A. Todd. 1995. "Understanding Information Technology Usage: A Test of Competing Models." *Information Systems Research* 6:144-176.
- Teo, T. S. H. and Siau Heong Pok. 2003. "Adoption of WAP-Enabled Mobile Phones among Internet Users". *Omega* 31:483-498.
- Venkatesh, Viswanath. 2000. "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model." *Information Systems Research* 11(4):342-365.
- Venkatesh, Viswanath and Fred D. Davis. 2000. "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies." *Management Science* 46:186-204.

Watson, Richard T., Leyland F. Pitt, Pierre Berthon, and George M. Zinkhan. 2002. "U-Commerce: Expanding the Universe of Marketing." *Journal of the Academy of Marketing Science* 30 (4): 333-347.

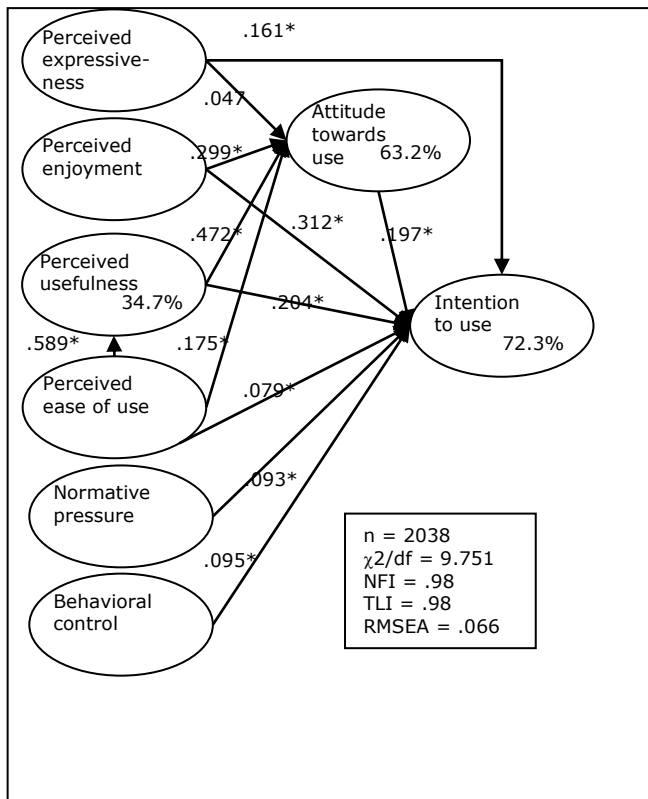
Williams, Larry J., Joseph A. Cote, and Ronald Buckley. (1989). "Lack of Method Variance in Self-Reported Affect and Perceptions at Work: Reality or Artifact?" *Journal of Applied Psychology* 81: 88-101.

Zinkhan, George M. and Melanie Wallendorf. 1985. "Service-Set Similarities in Patterns of Consumer Satisfaction/Dissatisfaction." *International Journal of Research in Marketing* 2 (4): 227-235.

Figure 1: Classification of Mobile Services

Service	Type of Interactivity	Process Characteristics
Text messaging	Person-interactive	Goal-directed
Contact	Person-interactive	Experiential
Payment	Machine-interactive	Goal-directed
Gaming	Machine-interactive	Experiential

Figure 2: SEM Model Results



*p<.05

Table 1: Sample Demographics

Age	Text Messaging	Contact	Payment	Gaming
0-19	97.3	9.9	29.1	19.2
20-29	2.6	40.2	42.8	50.3
30-39	.0	28.0	17.7	24.4
40-49	.0	14.0	7.2	5.2
50-59	.0	6.7	2.7	1.0
60 and over	.0	1.1	.6	.0
<i>Total</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
Education				
Primary	.0	8.3	38.4	2.6
Secondary	100	43.1	52.5	17.0
University <3	.0	28.2	7.9	32.0
University >=4	.0	20.3	1.2	48.5
<i>Total</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
Gender				
Male	44.3	55.2	44.9	91.1
Female	55.7	44.8	55.1	8.9
<i>Total</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>
n-complete	658	684	495	201

Table 2: Principal Components Analysis of all Measurement Items (Varimax Rotation)

Variables / Communalities (C) and loadings	C	1	2	3	4	5	6	7	8
7 Expressiveness									
I often talk to others about “service”	.69	.26	.16	.18	.15	.18	.07	.59	.40
Using “service” is part of how I express my personality	.76	.24	.11	.10	.28	.10	.02	.77	.12
Other people are often impressed by the way I use “service”	.83	.21	.06	.13	.15	.11	.02	.86	-.02
1 Enjoyment									
I find “service” entertaining	.86	.84	.21	.19	.16	.14	.08	.13	.13
I find “service” is pleasant	.87	.81	.21	.21	.18	.15	.09	.18	.15
I find “service” exiting	.87	.86	.10	.17	.14	.14	.03	.21	.04
I find “service” is fun	.90	.87	.17	.19	.15	.13	.05	.18	.12
5 Usefulness									
Using “service” makes me save time	.80	.25	.23	.30	.07	.75	.06	.11	.10
Using “service” improves my efficiency	.82	.24	.21	.32	.21	.73	.04	.14	.12
“Service” is useful to me	.79	.11	.19	.39	.19	.70	.12	.18	.13
2 Ease of Use									
Learning to use “service” is easy to me	.84	.19	.84	.17	.1	.15	.18	.04	.11
It is easy to make “service” do what I want it to	.82	.14	.83	.19	.12	.12	.16	.12	.01
My interaction with “service” is clear and understandable	.9	.16	.86	.21	.12	.15	.18	.09	.10
It is easy to use “service”	.88	.17	.84	.21	.13	.16	.21	.08	.13
4 Normative Pressures									
People important to me think I should use “service”	.75	.16	.17	.2	.77	.17	.08	.06	.18
It is expected that people like me use “service”	.87	.20	.15	.12	.86	.1	.01	.16	.12
People I look up to expect me to use “service”	.80	.17	.07	.12	.81	.09	0	.32	-.05
6 Behavioral Control									
I feel free to use the kind of “service” I like to	.66	.13	.21	.13	.04	.16	.74	-.02	.10
Using “service” is entirely within my control	.76	.06	.11	.03	-.02	-.03	.86	.02	-.07
I have the necessary means and resources to use “service”	.69	-.02	.20	.10	.06	.05	.79	.07	.12
3 Attitude									
Bad / Good	.82	.26	.31	.72	.15	.27	.12	.09	.14
Foolish / Wise	.84	.13	.18	.82	.13	.25	.08	.14	.11
Unfavorable / Favorable	.82	.23	.2	.80	.12	.18	.09	.09	.11
Negative / Positive	.84	.21	.22	.81	.15	.21	.1	.12	.08
8 Intention									
I intend to use “service” the next six months	.87	.32	.24	.38	.17	.32	.17	.16	.62
The next six months I intend to use “service” frequently	.88	.38	.26	.3	.24	.19	.1	.23	.65
Eigenvalues		11.60	2.60	1.74	1.55	1.32	1.04	.78	.62
Variance explained		44.62	10.00	6.70	5.95	5.07	3.99	2.98	2.39
Mean		3.25	4.72	4.24	2.42	3.78	5.23	2.21	3.60
Standard deviation		1.82	1.68	1.69	1.59	1.70	1.67	1.36	2.12
Cronbach’s alpha		.95	.95	.93	.86	.87	.77	.81	.90

Table 3: Intervariable Correlations, Root Average Shared Variances, and Composite Reliability

	Express.	Enjoy	Useful	Ease of Use	Norm	Control	Attitude	Intention
Composite reliability	.82	.95	.87	.95	.87	.77	.93	.90
Expressiveness	.77							
Enjoyment	.63	.91						
Usefulness	.56	.58	.84					
Ease of use	.40	.48	.59	.90				
Normative pressure	.62	.51	.52	.39	.83			
Behavioral control	.21	.26	.35	.53	.17	.73		
Attitude	.51	.58	.80	.61	.47	.37	.87	
Intention	.64	.70	.75	.60	.55	.41	.74	.90

Table 4: Differences in Antecedents of Intention to Use: A Cross-Study Comparison

Hyp .	Proposed Categories	Variable	Constrained	Service Category (goal-directed/person interactive)	Service Category 2 (experiential/machine interactive)	χ^2 difference (df = 1)
2a	Goal-directed versus experiential	Usefulness	.20* (7.35)	.17* (4.03)	.22* (6.30)	.64
2b+	Goal-directed versus experiential	Ease of use	.02 (.61)	.13* (2.58)	-.03 (-.79)	7.74*
2c+	Goal-directed versus experiential	Enjoyment	.39* (15.15)	.31* (8.20)	.46* (13.40)	7.86*
2d+	Goal-directed versus experiential	Expressiveness	.38* (9.32)	.15* (2.51)	.54* (10.05)	22.00*
2e-	Person-versus machine-interactive	Attitude	.25* (7.68)	.30* (7.80)	.12 (1.81)	5.09*
2f+	Person-versus machine-interactive	Normative pressure	.09* (3.07)	.13* (3.85)	-.05 (-0.79)	5.48*
2g+	Goal-directed versus experiential	Perceived control	.08* (3.43)	.27* (4.91)	.04 (.15)	14.61*

* $p < .05$.

Note: + indicates support for the proposed hypothesis;– indicates significant findings in the opposite direction of the proposed hypothesis. Columns 4-6 include path coefficients (regression weights); t-values are in parentheses.

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