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December 2006

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THE IMPORTANCE OF PREVIOUS EXPERIENCE FOR THE TRIAL OF MOBILE SELF-SERVICE TECHNOLOGIES

Human-Computer Interaction

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Abstract

An increasing number of companies utilize mobile communication such as advertisements via Short Message Service (SMS) or mobile payment to facilitate interaction with their customers. Given the manifold potentials of mobile technologies, it is not surprising that a lot of innovative business models and services are emerging. In this paper we first discuss various theories of technology diffusion and trial of technology, which are frequently used in information systems and marketing research. Subsequently, we present a system which allows ordering products by simply photographing an advanced form of barcode, which can be placed on virtually any printed media, the product itself, or even be shown on television. We use a Structural Equation Modeling approach to measure the importance of various antecedents of trial, namely the ability to use a mobile technology, users' role clarity, and both extrinsic and intrinsic motivation. Furthermore, the role of previous experience as a moderator of the antecedents of technology trial is explored. The results show that there is a significant difference between experienced and inexperienced users regarding the trial of this service innovation.

Keywords: Self-service technologies, technology adoption, mobile shopping, quick response code

Introduction

During recent years mobile devices have gained widespread global acceptance. These devices are not only used for communication purposes, but also for entertainment, payment, and navigation (Scharl et al. 2005). According to a study of A.T. Kearney and Judge Business School, 53% of cellular phone customers worldwide are able to access mobile multimedia services (Menon et al. 2005). In Northern America this ratio has risen from 37% to 48% between 2004 and 2005, while in Western Europe there was an increase from 49% to 52% and in Japan even from 79% to 83%. The tremendous growth of cellular phones' diffusion rates not only impacts users' forms of communication but also various other aspects of modern life. By facilitating mobile data transmission and sophisticated multimedia applications, these devices can be seen as enablers of impulse buying and target-oriented marketing.

Modern marketing strategies depend heavily on the existence of an effective and efficient IT infrastructure. Electronic Customer Relationship Management, whose theoretical foundations are deeply rooted in various marketing concepts, would be impossible to carry out without the help of modern technology to easily gather, process, and store vast amounts of customer data (El Sawy and Bowles 1997; Romano and Fjermestad 2002; Zahay and Griffin 2003). Therefore it comes as no surprise that in recent years both IS scholars and marketing researchers increasingly started investigating the potential of new technologies in order to improve the way in which companies interact with their customers. While the potentials of Electronic Commerce have been extensively covered in scholarly literature, many capabilities of mobile applications still wait to be unleashed. Especially the capacity of mobile devices to enable shopping independent of time and location holds a vast potential for organizations offering

products usually bought spontaneously. However, in order to be successful, those technologies must be tried and adopted by customers, which is the main focus of our research. The remainder of this paper is structured as follows. In the next section, several adoption theories are presented, followed by a discussion of the role of prior experience in IS research. The results of an empirical survey show how ability, role clarity, and motivation influence technology trial and highlight the importance of experience as a moderating variable. We conclude this paper with a summary and future research avenues.

Theoretical Background

Diffusion and Technology Acceptance Theory

The work of Rogers (1962), which has laid the foundation for the research on the diffusion of innovations, has stimulated countless empirical surveys and has been confirmed in various areas (Au and Enderwick 2000). Rogers (1962) defined five factors influencing consumer's adoption decisions, namely relative advantage, compatibility, complexity, communicability, and trialability. Communication channels play a fundamental role for the diffusion of innovations. In general, information about an innovation is communicated within a social system with the help of mass media or interpersonal communication. While some might choose anonymous mass media, others prefer interpersonal channels, such as word-of-mouth and peer influence, in their information seeking process. Furthermore, Rogers (1962) identified different types of customers (innovators, majority, and laggards), as well as factors influencing the diffusion process. Tomatzky and Klein (1982) found that three of the innovation characteristics (perceived advantage, compatibility, and complexity) Rogers used were consistently related to adoption behavior.

A frequently cited adoption model in information systems is Davis' technology acceptance model (TAM) (Davis 1989). The TAM adapted the Theory of Planned Behavior (Fishbein and Ajzen 1975; Ajzen and Fishbein 1980) by including technology in order to explain computer usage and incorporated major parts of the theory of diffusion of innovations. According to Davis et al. (1989, p. 985), the goal of TAM is "to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified." The TAM has successfully predicted and explained individuals' intention to adopt and actual adoption across a variety of studies. Gefen and Straub (2000) provide a synopsis of TAM studies from 1989-2000. Various model extensions have been made. Among them are variables such as gender (Gefen and Straub 1997; Venkatesh and Morris 2000), age (Morris and Venkatesh 2000), social norms (Pedersen and Herbjorn 2003), and culture (Straub et al. 1997). Furthermore, TAM has already been used to explain the adoption of telecommunication services such as telework (Hu et al. 1999), mobile telephones (Kwon and Chidambaram 2000), and mobile commerce services (Pedersen et al. 2003). These studies suggest that the underlying assumptions of usefulness need to be modified in order to explain the adoption of mobile services. The most recent model development and assessment was carried out by Venkatesh et al. (2003) who evaluated existing models to build a unified theory of technology acceptance. The unified theory of acceptance and use of technology (UTAUT) comprises four core factors determining intention to use – performance expectancy, effort expectancy, social influence, and facilitating conditions. Gender, age, experience, and voluntariness of use moderate the key relationships in the model.

Self-Service Technologies

The role of technology in the process of creating value for an organization has been discussed controversially (Carr 2004). Nonetheless, in marketing literature several researchers concede a major importance of technological improvements for the interaction process of companies with their customers and predict an even more important influence for the future. These predictions can be justified with expected changes in customers' life-style (Colby and Parasuraman 2003). During recent years the diffusion of self-service technologies (SST) gained widespread interest in scholarly research. SST are defined as "technological interfaces that enable customers to produce a service independent of direct service employee involvement" (Meuter et al. 2000, p. 50). Day-to-day examples of such technologies include ticket machines, electronic check-in terminals at airports, or online-banking. The provision of such technologies in the service sector is perceived as being a major contributor to a company's overall success. Especially the ease of processing transactions shapes today's fast-paced world (Meuter et al. 2000). In order to save costs, satisfy increasing customer demand, and open up new channels for sales, companies continue to implement

self-service technologies (Bitner et al. 2002). Accordingly, investigating antecedents of users' acceptance of such technologies gains popularity with scholars and practitioners.

To assess the general acceptance of a self-service technology, it is necessary to take a closer look at the different stages of the adoption process. An important precondition imposes users' awareness of the respective technology. As soon as the first stimulus has sparked interest, in the investigation phase information about the innovation is collected and evaluated. A positive judgment will subsequently lead to a trial of the service and, depending on the subjective evaluation of the test, users may opt for repeated use which, in turn, will lead to commitment. Customers' disposition to give a new technology a trial ("Consumer Readiness") is furthermore determined by their ability, i.e., the perceived capability to perform the behavior, role clarity, and motivation (Meuter et al. 2005). In order for a self-service technology to be tried, all of these three factors must exceed a certain threshold (Bitner et al. 2002). While "Role Clarity" and "Ability" can at least partly be controlled by a company during and after the launch of a new technology (e.g. by offering product support), other antecedents are difficult or impossible to influence. Examples of these include users' demographic characteristics and individual attributes, such as technology affinity and previous technology-related experiences. Furthermore, it is necessary to differentiate between extrinsic and intrinsic motivation. The usage of new technologies per se and a potential increase in status may be seen as intrinsic, while extrinsic motivators may include savings in time and cost (Meuter et al. 2005). The willingness to try a technological innovation can be seen as the most important phase during the adoption process. The "Technology Readiness Index (TRI)", developed by Parasuraman (2000), clearly shows the multidimensionality of the technology readiness construct. While innovativeness and optimism can be seen as important drivers of adoption, discomfort and insecurity impose major obstacles. Additionally, personal characteristics determine users' decisions to give a new technology a try. On the basis of an empirical survey of users and non-users of an interactive voice response telephone system, Meutner et al. (2005) show that factors such as inertia, technology anxiety, and previous experience with self-service technologies impose major determinants of the adoption process. Prior experience additionally influences users' perceived risk. As far as demographic attributes are concerned, age, gender, and income exert a significant influence while education is less important. Some of these factors were found to be interdependent. A negative influence of age on trial and a low intention to change previous behavior may be lessened by a clear role definition.

According to the results of Meuter et al. (2005), we hypothesize that ability, role clarity, intrinsic motivation, and extrinsic motivation positively influence the trial of a mobile self-service technology.

Prior Experience with Technology Usage

Prior experience can be an important determinant of behavior (Ajzen and Fishbein 1980; Bagozzi 1981). It has been suggested that knowledge from past behavior shapes users' intentions (Fishbein and Ajzen 1975). This is due to more accessible memory (Fazio and Zanna 1978) and the fact that events in past experience are salient and so they are accounted for in the formation of intentions (Ajzen and Fishbein 1980). Taylor and Todd (1995) investigated the role of prior experience on IS usage. They used an augmented version of TAM and compared experienced with inexperienced user groups. Their results show that experienced users' behavioral intentions have a stronger influence on actual behavior than those of inexperienced users. The authors suggest that this is due to the challenges involved with using a service when one is inexperienced. Additionally, they found that intention is better predicted by exogenous variables such as attitude, norms, and perceived behavioral attitudes when it comes to inexperienced users as opposed to experienced ones. Based on the TAM model, Stoel and Lee (2003) investigated the effect of experience over time with regard to students' acceptance of courseware. It is suggested that an individual's prior experience influences perceptions of ease of use and usefulness of a particular technology (Igbaria et al. 1995). A longitudinal study about e-mail usage shows that when a user becomes more experienced, perceptions of usefulness directly determine intention to use and actual usage (Szajna 1996). More recently in UTAUT Venkatesh et al. (2003) provide a thorough review of literature and also a model test. They include experience as a moderator in their model, rather than as a latent variable with a direct effect on other latent variables. In total, there exist three ways in which experience was included in previous research: (a) as a latent variable with direct effects on other latent variables, (b) in longitudinal studies in which the effect of experience is observed over time and finally (c) as experience moderating direct effects of other variables. In the research at hand it is hypothesized that experience has an overall effect on users and on their perceptions. Therefore it is not included as a construct within the model, but rather incorporated as a moderator.

We hypothesize that differences between experienced and inexperienced users regarding their influences of antecedents on trial of mobile technologies exist.

Mobile Shopping – Impulse Buying via Mobile Channels

Impulse purchases are defined by Bellenger et al. (1978) as "purchases resulting from a decision to buy after the shopper entered the store". In contrast, Rook (1987, p. 191) highlights the importance of intrinsic motives: "Impulse buying occurs when a consumer experiences a sudden, often powerful and persistent urge to buy something immediately. The impulse to buy is hedonically complex and may stimulate emotional conflict. Also, impulse buying is prone to occur with diminished regard for its consequences". As opposed to the first definition, in the latter the buying process is not attached to a certain place (e.g. a brick-and-mortar store), but rather determined by motivational and situational factors. Stern (1962) differentiates between various types of impulse buying, such as "pure impulse buying", "reminder impulse buying", "suggestion impulse buying", and "planned impulse buying". However, with the exception of "pure impulse buying" all forms of purchasing imply a certain amount of previous purchase intention or actual need for the product. In the case of "planned impulse buying", for example, customers enter a store with the intention of buying products that meet certain requirements (e.g. discounts or rebates). According to Bellenger et al. (1978), the characteristics of the product itself heavily influence the decision process. They mention costume jewelry, bakery products, and womens' sportswear as those products most likely to be bought spontaneously. A similar survey from Abratt and Goodey (1990) ranks confectionary first, followed by books and magazines, and wine. Subsequently, the question has to be raised as to which general factors actually lead to impulse purchases. Stern (1962, p. 61f) specifies nine major influences for impulse buying: a low price, marginal need for item, mass distribution, self-service, mass advertising, prominent store display, short product life, small size or light weight, and ease of storage. Interestingly, with the exception of "marginal need for item", this enumeration largely ignores the role of the customer and concentrates on product attributes or marketing and distribution strategies. Rook (1987) criticizes an "impulse taxonomy" of products based on their attributes and highlights the importance of subjective decisions. According to him, a TV set or a piece of furniture may be equally suited for impulse buying as a bag of potato chips or sweets.

During recent years the buying process has become more independent of time and location. Companies took the chance to reach customers over various new media channels and improved their communication strategies. B2C-E-Commerce enabled Internet users not only to place orders online, but also to transfer payments electronically. When ordering digital goods, even the distribution process can be performed by transferring bits and bytes. However, in nearly all of these scenarios users have to actively initiate the contact, which can be done by booting a computer and visiting an online shop. Once being online, a couple of situations exist where Internet users might get into contact with product offerings they have not requested, as may be the case when online advertisements are displayed. However, strict legal regulations, a low rate of acceptance on the side of the consumers, and software solutions, such as popup blockers, prevent companies from aggressively utilizing online push advertising. Therefore it seems quite promising for many companies to allow for instantaneous orders when customers are exposed to advertisements in the offline world.

Quick response (QR) codes, which are matrix codes originally being developed by the Japanese corporation Denso-Wave in 1994, bear the potential to link the online to the offline world. In recent years a multitude of applications have been developed that make use of this technology, one of them being mobile shopping. Orders can be easily placed by photographing the QR code, which can be printed on any kind of advertisement, and the information sent via Multimedia Messaging Service (MMS). The message is directly transferred to a databank and decrypted by a decoder, which is able to read even distorted pictures with low resolution. A short time later, the customer gets a confirmation via SMS or MMS. Besides facilitating the order process, buyers have the opportunity to pay via their cellular phone bill. Other potential applications include the download of videos after reading an ice hockey report in the newspaper (www.upcode.fi), comparing prices in retail stores, finding concert dates from your own CD collection, watching a virtual tour, and obtaining pricing from a real estate sign (www.paperclick.com). The use of such codes is not restricted to print media, as is illustrated by the Japan-based company Colorzip (www.colorzip.co.jp), which plans to display their codes on TV screens, T-shirts, outdoor boards, and Web banners. Other companies even strive to get rid of codes. Nevenvision (www.nevenvision.com) works on ways to get information by simply transmitting a picture of an object, as would be the case when photographing a famous painting and receiving an audio-visual narrative in return. Similarly, Photo Navi Wine (http://wine55.jp/pc/index.html) simply requires users to attach a photo of a wine label in order to get further

information (Trendwatching.com 2006). Mobile shopping with a QR code enables spontaneous shopping as identified by Stern (1962). The only prerequisites to buy via the cellular phone is the perception of an advertisement or a product carrying a code, and the availability of a cellular phone with multimedia capabilities. The purchase transaction can be carried out spontaneously in a digital way. In addition to physical proximity and social comparison, temporal proximity accounts for the success or failure of spontaneous shopping. This is the time span between a stimulus and the potential "reward". An immediate availability of such a reward tends to increase the desire for achieving it (Hoch and Loewenstein 1991). This clearly confirms the advantages (from a company's point of view) and the problems (e.g. in the case of thoughtless shopping) of mobile shopping. For the first time the opportunity to order at any time and at any place actually enables impulse buying in its purest form, i.e., being exposed to a stimulus without active participation and being able to order instantaneously.

	Contact	Order/ Product Selection	Payment	Shipment/ Service
Stationary Retailers	visit (real world)	immediately	cash/check/ credit card	immediately
Catalog Order	catalog	immediately/ later	cash on delivery/ check	later
Electronic Commerce	visit (online)	immediately/ later	online or offline, instant payment is possible	later (exception: digital goods)
Mobile shopping with QR code	passive	immediately/ rarely:later	instant payment via mobile phone is possible	later (exception: digital goods)

Figure 1: A Comparison of Shopping Styles

In Figure 1 we compare mobile shopping by QR codes with other ways of shopping. Due to the ubiquity of advertisements, no specific activity from the side of the users is necessary to get in contact with a certain offer. Especially when advertisements appear at public places, we expect orders to be conducted rather spontaneously due to the increased efforts of revisiting the place. In contrast to E-Commerce, it is possible to include product samples in magazines in order to create a haptic and sensual experience for the consumer. As far as further steps of the transaction are concerned, mobile shopping with a QR code resembles online shopping, which allows for immediate payment and, in the case of digital goods, also for immediate delivery.

Empirical Survey

In order to evaluate users' readiness to try mobile shopping, we carried out a survey amongst the readers of two popular lifestyle magazines. Those magazines are especially suited, since their target group of young, urban readers matches the potential customers of mobile shopping. A total of 37,880 readers received the questionnaire as an insert with their magazine. They were invited to participate and asked to fill out the questionnaire, which contained a QR code. The respondents had to take a picture of this code and send it to a cellular phone number. This assignment allowed for the assessment of users' capability to carry out the steps necessary for mobile shopping. The respondents could choose from different ways of filling out the questionnaire, including online, facsimile, postal mail, and scanning the questionnaire and sending it via e-mail. In total 1.072 questionnaires were completed and used for the analyses.

Figure 2: The QR Code in the Questionnaire

Four constructs, which were identified as determinants for trying self-service technologies by Meuter et. al. (2005), were included in the model. The antecedents "role clarity", "ability", "intrinsic motivation", and "extrinsic motivation" were measured by using previously validated items, which were identified by literature review, adapted to the underlying context, and pretested. All the items were translated into German and back-translated into English. Then a native speaker checked the original and the back-translation for semantic consistency.

Results

Sample Structure

About half of the respondents (47%) are between 21 and 30 years old. One out of four is between 31 and 40 years old. The remaining part falls into 13% for under 20-year-olds and 15% for over 40-year-olds. The average age is 30. Regarding gender the sample is nearly equally distributed with 46.5% males and 53.5% females. The participants were also asked about their income. 30% earn less than 1,000 euro a month, 46% between 1,000 and 2,000 euro, and the remaining 24% more than 2,000 euro. In general, the sample can be considered as well educated. More than one third finished some sort of college or university. Nearly half of the respondents completed their A-levels and only 19% finished secondary school. A total of 69.5% of the respondents possess a cellular phone with an integrated camera, which is a precondition for making use of QR codes. Three out of four respondents state that they are able to use a cellular phone for making pictures. Slightly fewer (60%) have already transmitted an MMS including a picture, which shows that a technology's mere availability does not automatically lead to its usage. Furthermore, it is interesting to note that the number of cellular phone users claiming to be able to take a picture exceeds the number of respondents who actually possess a phone with multimedia capability. In the next step we compare different user groups based on their level of prior experience. In order to assess whether users differ according to their degree of experience with mobile services, they were split into four groups. It is hypothesized that users differ with regard to the ownership and usage of a cellular phone. Cross tabulations with chi-square tests were conducted.

Table 1: Chi-square Tests

	Ownership of camera phone	*Ability to take a photo*	*Ability to send an MMS*	*Snapcode sent*
Experienced Users	25%	24%	30%	31%
Rather Experienced Users	43%	44%	45%	44%
Rather Inexperienced Users	24%	25%	20%	20%
Inexperienced users	8%	7%	5%	5%
df	3	3	3	3
χ	40.464	47.874	131.861	31.069
p	<0.001	<0.001	<0.001	<0.001

In all cases the results were highly significant ($p < 0.01$). Sixty-eight percent of the owners of mobile camera phones are experienced or rather experienced users. Similar results were found for the ability to take a photo. Sixty-eight percent of the respondents, who state that they are capable of using a cellular phone for taking pictures, consider themselves to be experienced or rather experienced. The next test assessed the relationship between experience and the ability to send an MMS. Again, the results were significant. Three out of four respondents who state that they are able to send a MMS can be found in the group of the experienced and rather experienced users. About a quarter of all respondents actually sent the code, which was part of the survey. The majority of them (75%), again, was made up of experienced users.

In our survey we were also asking the users about their attitude toward impulse buying. Generally speaking, users who are more prone to buy on impulse are also the ones who are more experienced with mobile services. The types of products people would buy via their cellular phone are similar to the ones which they regularly buy online. CDs and DVDs are in the lead with 29%, followed by books (28%), electronic devices (27%), clothes (22%), cosmetics (11%), and tickets (8%).

Model Fit

We analyzed the data using Mplus with the robust weighted least squares estimator (WLSMV), since we used a four-point Likert scale and our data was not normally distributed. The four-point scale was chosen in order to avoid a central tendency error (Gotzamani and Tsiotras 2001; Wong and Aspinwall 2005) and to account for the fact that users usually lack the discriminatory power to differentiate between fine-grained scales (Dickinger 2006). Due to its superior performance in comparison to the WLS (weighted least square parameter) when dealing with moderate sample sizes, the WLSMV is considered to be robust (Muthén and Muthén 1998). Overall, the data fits the model well. Table 2 shows the fit of the whole model and the fit of the model when four groups are estimated. The Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) are given. The minimum value of .9 for CFI and TLI is exceeded. The maximum value of .8 for RMSEA is not exceeded with .075 (Anderson and Gerbing 1984; Hu and Bentler 1995) for the four group model.

Table 2: Fit Indices

Model	CFI	TLI	RMSEA
Whole model	0.956	0.956	0.083
Four groups	0.957	0.963	0.075

In a next step the measurement model is analyzed. Therefore the average variance extracted (AVE) and the construct reliability (CR) according to Fornell and Larcker (1981) is calculated.

Table 3: Average Variance Extracted, Construct Reliability, Shared Variance

Factor	CR	1	2	3	4
1 Ability	0.85	0.66			
2 Role clarity	0.89	0.05	0.80		
3 Extrinsic motivation	0.83	0.07	0.14	0.62	
4 Intrinsic motivation	0.70	0.09	0.07	0.28	0.54

Table 3 shows the AVE values on the diagonal. The recommended minimum value of 0.5 is exceeded by all the constructs and CR equals or is above the recommended value of 0.7, indicating a good fit of the measurement model. To evaluate the construct validity, the squared correlations of the latent variables are compared with the AVE. The squared correlations of the latent variables can be found below the diagonal in Table 3. All the values are well below the ones for AVE, showing a satisfying discriminant validity.

Table 4: Reliability and Validity of Scales

Items	Cronbach's Alpha	Factor Loading
Ability 1	0.752	0.814
Ability 2	0.746	0.857
Ability 3	0.753	0.762
Role Clarity 1	0.734	0.898
Role Clarity 2	0.739	0.910
Extrinsic Motivation 1	0.739	0.769
Extrinsic Motivation 2	0.740	0.805
Extrinsic Motivation 3	0.722	0.796
Intrinsic Motivation 1	0.745	0.668
Intrinsic Motivation 2	0.743	0.790

Table 4 shows the factor loadings and Cronbach's alpha of the items used in the questionnaire. As can be seen, all alpha values exceed 0.7, which is a commonly accepted threshold in scholarly literature (Nunnally 1978). The factor loadings, which have a range from 0.668 to 0.910, indicate sufficient item validity (Hair et al. 1998; Tabachnick and Fidell 2001).

Group Comparisons

It was hypothesized that the importance of the antecedents varies with the level of users' experience. Therefore the respondents were asked whether they were experienced or inexperienced users of mobile services. Splitting the

sample according to the respondents' self-assessment resulted in 226 respondents in group one (experienced), 446 respondents in group two (rather experienced), 291 respondents in group three (rather inexperienced), and 109 respondents in group four (inexperienced). To learn more about the group differences, three models were estimated. The first one with measurement non-invariance, the second one with factor loading invariance, and the third one with factor loading and intercept invariance. Table 5 illustrates the results of the model estimation. The unstandardized factor loadings for the groups, the standard error, and the tolerance interval are provided. Table 5 shows that there is a significant difference between groups.

**Table 5: Unstandardized Loadings, Standard Error, Tolerance Interval**

Path	Group 1 Loading	Group 2 Loading	Group 3 Loading	Group 4 Loading	S.E.	Tolerance interval
Ability -> Trial	0.395	0.149	0.058	0.039	0.141	-0.090 – 0.206
Role clarity -> Trial	0.265	0.239	0.084	0.190	0.076	-0.076 – 0.244
Extrinsic motivation -> Trial	0.546	0.512	0.334	0.377	0.155	0.062 – 0.606
Intrinsic motivation -> Trial	0.146	0.367	0.585	0.220	0.220	0.247 – 0.923

The hypothesized moderator effect of experience is tested for with regression analysis within subgroups. Since subgroup analysis facilitates the interpretation of interactions and non-linear effects, the structural model allows the estimation of the path estimates to vary freely. The measurement model is held equal across groups. The results show that several differences between the groups exist. In Figure 3 the values with white background are the ones for the experienced users and a darker shade of gray indicates less experience. For group one, the most experienced one, the most important determinant for trial is the extrinsic motivation (0.384), followed by the ability to carry out shopping via a mobile device (0.351), role clarity (0.251), and intrinsic motivation (0.093). Extrinsic motivation turns out to be also the most important factor for group two (0.316), with the other determinants being of nearly equal weight. For group three intrinsic (0.320) and extrinsic (0.212) motivation are of high importance, while the values for ability (0.059) and role clarity (0.069) are rather low. The important role of extrinsic motivation (0.313) for group four, the inexperienced users, is particularly interesting, indicating that they rate the importance of time savings and convenience of mobile shopping as very high.
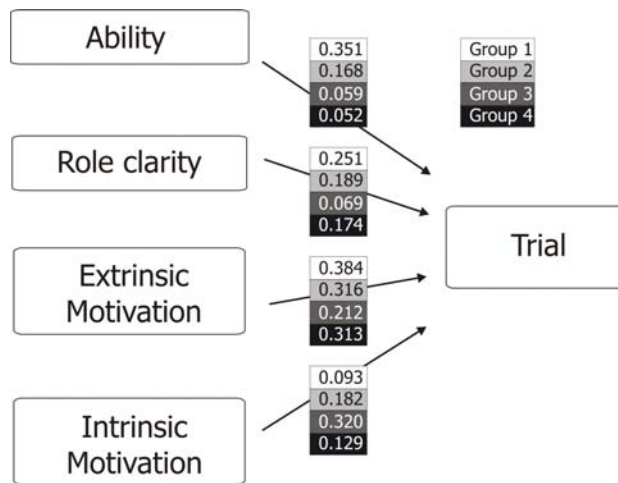
Figure 3: Model of Mobile Shopping Trial for Four User Groups

Figure 4 depicts the standardized loadings of the path estimates for the four user groups as a line chart in order to illustrate the differences between the groups.
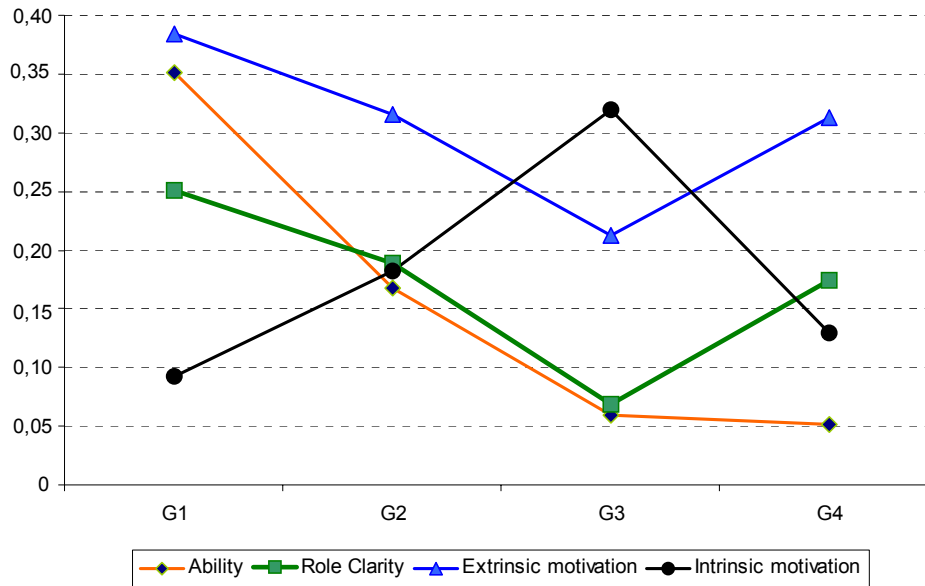
Figure 4: Moderating Effect of Experience on the Path Estimates

The moderating effect of experience is clearly not linear. Extrinsic motivation and role clarity show a U-shape and intrinsic motivation has an inverse U-shape. The falling slope of ability is evident, since the ability to carry out a purchase with a cellular phone comes with prior experience. Therefore it makes sense that the effect of ability on trial is highest for the experienced users. This is somehow similar for role clarity. Experienced users generally are more confident in dealing with mobile services, and not knowing how to perform mobile shopping hinders the less experienced group. Interestingly, the importance of role clarity for the least experienced users exceeds those of the previous group. Most remarkable are the influences of extrinsic and intrinsic motivation, the former being U-shaped and the latter inversely U-shaped. This indicates that convenience is quite important for the most experienced and most inexperienced users, while fun and curiosity is rather low for these two groups.

Conclusions

In this paper we discuss the current state of self-service technology research and introduce a practical application of mobile shopping. In the literature section we present various models of technology acceptance and highlight the importance of prior experience for technology usage. The advent of self-service technologies, which was in large part accelerated by mobile technologies, calls for modifications of traditional acceptance models, due to their dependence on experienced and technology-savvy users. We present an innovative way of shopping, which can be done by simply photographing a barcode displayed on any print media and submitting it to a vendor. An empirical survey with readers of lifestyle magazines was carried out to reveal important antecedents for the trial of self-service technologies. Not only the availability of technological equipment and the users' ability, which can be seen as prerequisites, but also intrinsic and extrinsic motivators and role clarity were found to be important influencing factors for the trial of mobile shopping.

We compared the importance of the aforementioned antecedents between four groups of users differing by their level of previous experience. We found a non-linear relationship of all antecedents, which challenges the general assumption of linearity that is frequently found in scholarly research. The results may help practitioners to spot the most important issues when targeting consumer groups with a varying level of previous experience. Especially when self-service technologies are concerned, the vendor usually has no or little influence on the customer during the buying process. Therefore we consider it to be of crucial importance for vendors to know about those antecedents which turn prospects into buyers. Contrary to buying at stationary retailers or using catalog orders, mobile shopping imposes much higher demands on the consumers as far as technological knowledge is concerned. Besides making the buying process as simple as possible, motivating the customers extrinsically and intrinsically according to their respective needs, may be the greatest challenge for sellers.

As with any research, this study has some limitations that simultaneously are opportunities for future research. In order to generalize the results, replication studies in different countries are necessary to account for potential cultural differences and a self-selection bias. Since we have purposely chosen readers of lifestyle magazines, the preferred target group for innovative shopping technologies, the results may not be transferable to other parts of the population. Future research should take into account the influence of psychographic factors on the acceptance of new technologies. Investigating this relationship is one of the next important steps in technology acceptance research. Additionally, we recommend qualitative research studies that could help to explain the relationship between experience and motivation in more detail.

Appendix

Items	Scale	Source
Ability 1	I am capable of taking a picture with my cellular phone.	Adapted from Jones (1986), Johnson and Marakas (2000) (Self-Efficacy scale)
Ability 2	I have successfully sent an MMS message in the past.	
Ability 3	I am fully capable of using Snapshopping.	
Role Clarity 1	I believe that it is easy to learn how Snapshopping works.	Adapted from Rizzo et al. (1970)
Role Clarity 2	The process of using Snapshopping is clear to me.	
Extrinsic Motivation 1	Ordering a product with Snapshopping is convenient.	Adapted from Meuter et al. (2005)
Extrinsic Motivation 2	Using Snapshopping allows me to carry out the order fast and easy.	
Extrinsic Motivation 3	When I use Snapshopping I like the opportunity to order a product whenever and wherever I want.	
Intrinsic Motivation 1	Using Snapshopping for ordering products is an innovative way to spend time.	Adapted from Meuter et al. (2005)
Intrinsic Motivation 2	Using Snapshopping to order a product provides enjoyment.	
Experience	I consider myself as being experienced in using mobile services.	
Trial	I would like to try Snapshopping.	

* The original survey was conducted in German. In order to make sure that the intended meaning of the items has been retained unchanged, the items were translated and back-translated by two individuals fluent in both German and English. A native speaker checked the original and the back-translation for semantic consistency.

Acknowledgements

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