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## Mobile Games: Analyzing the Needs and Values of the Consumers

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### Abstract:

Mobile games are one of the largest mobile application areas and one where users are often willing to pay for services. Furthermore, the market for mobile games is expected to grow dramatically as most phones sold now are capable of running games. Despite this, there is surprisingly little research concerning user expectations from mobile games. In this exploratory study, we examine the consumers' values, needs, and objectives related to mobile games. Based on earlier literature on mobile services, we developed a preliminary set of issues and did an exploratory survey of mobile game users to find the key needs and values of mobile gamers.

The results of the study are especially interesting for mobile game developers and mobile phone operators, as they shed light on the demographics and choices of mobile gamers. We argue that if mobile games are ever to be diffused in greater extent to the market, then a deeper understanding of the values and needs of the potential mobile game users must be obtained. This understanding can then be used to guide the development of new game offerings.

**Keywords:** mobile games, values, objectives, consumers, principal component analysis, cluster analysis

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## INTRODUCTION

During the last two decades, mobile phones have diffused all over the planet, and the core services provided by the telecom operators (e.g., voice and text messaging) have become commodities. Markets for commodities are typically efficient and quickly respond to changes in supply and demand, driving down prices and making the basis of competition on price. Therefore, in order to remain competitive, many mobile operators have sought cost efficiencies through economies of scale. This has led to a high level of consolidation in the mobile phone operator market. To deviate from competition, companies usually explore ways to provide value-added services for their customers. Operators have considered mobile games<sup>1</sup> as a good value-added service for a long time. According to several market research firms (e.g., Juniper, Gartner) the Asian mobile gaming market is growing very fast and the total number of mobile gamers is estimated at 400 million people. The value of the global mobile games market is expected to rise from \$5.4 billion in 2008 to more than \$10 billion in 2013 (RCR 2008). It is notable that these estimates are based only on OTA downloads through cellular networks.

The logic behind these bold estimates is the expansion in the smart phone markets. The shipments of smart phones have grown rapidly during the last few years. According to Canalys.com (2008), 35.5 million smart phone devices were sold in the fourth quarter of 2007, displaying growth rates of over 50 percent during the last two years. The growth of the smart phone market creates a more fruitful basis for the diffusion of mobile games as the games played on smart phones are more sophisticated and more interesting. The recent introduction of Apple AppStore, together with iPhone3G, highlights the importance of games, as almost a third of available titles are games—over 1,700 games as of January 2009 (Rybicki 2009).

Previous research on mobile games has dealt with the new possibilities of mobility, e.g., location-based games (Han et al. 2005) and support for combining dimensions of the physical world and our social surroundings into games (Peltola and Karsten 2006). Most mobile game research to date has dealt with technical aspects of the games (see, e.g., Bell et al. 2006; Fritsch et al. 2006). In addition, there is some emerging research into the business models of the software companies producing mobile games (Rajala et al. 2007).

## CONTRIBUTION

Our study provides new insights into mobile game buying process from the perspective of customer values.

With previous research on mobile services and value-focused thinking (Keeney 1999) as our starting points, we developed an Internet-based survey to collect empirical data on mobile gamers' needs and values. We uncovered four fundamental objectives for buyers of mobile games: (1) Satisfaction of quality expectations, (2) Gaming experience, (3) Ease of setup, and (4) Social aspects of games. The means to achieve these fundamental objectives were: (1) Audiovisual effects, (2) Shopping and Services, (3) Customer support, (4) Trust, and (5) Trialability. These items are important for players, but their importance varies according to the types of players. We clustered the users into four clearly identifiable groups that differ on their gaming interests and needs as well as the shopping experience expected by them.

The results of the study are especially interesting for mobile game developers and mobile phone operators as they shed light on the demographics and choices of mobile gamers. The fundamental objectives and means to achieve them can be used to develop games that better satisfy the varying customer needs. Furthermore, the clusters we found can be used to segment the gamers. The player segments, which differ on their values and playing habits, can guide development of different types of games.

From the academic point of view, the results are interesting, indicating that also in the context of digital goods, the users' needs and their purchasing behavior varies. Methodologically, we reviewed the value focused framework of Keeney (1999) and developed an internet-based survey instrument based on it.

<sup>1</sup> In this paper, we define mobile games as games played on mobile phones. More specifically, we concentrate on games that are downloaded onto the mobile phone. We acknowledge that there are other mobile gaming devices, such as, Nintendo Game Boy, but we leave these games outside the scope of our study.



Despite the potential of mobile games for different stakeholders, the extant literature provides little empirical research on the actual consumer values regarding mobile games (Anckar and D'Incau 2002; Barnes 2002; MGAIN 2003). Therefore, in this paper, our objective is to explore the values, needs, and objectives related to the purchasing process of mobile games. We use the value-focused model by Keeney (1999) and draw on a survey among 714 Finnish mobile game consumers. We chose Keeney's approach for identifying consumer values in favor of others, such as personal construct theory (Kelly 1955) and laddering (Gengler and Reynolds 1995; Peffers, et al. 2003) to get fresh insights into the values behind the process. Beginning with an initial set of sixty-two items, including twenty-five fundamental objectives and thirty-seven means objectives related to consumer values, we reduce the number of variables by using principal component analysis, and find four key dimensions for fundamental objectives and six key dimensions for means objectives.

This paper explores the primary components of the values and needs of the mobile game users. The results of the study are especially interesting for mobile game developers and mobile phone operators as they shed light on the demographics and choices of mobile gamers. We argue that if mobile games are ever to be diffused in greater extent to the market, a deeper understanding of the values and needs of the potential mobile game users must be obtained.

The paper is organized as follows. After this introduction, we present the relevant literature on consumer values and mobile games in the second section. In the third section, we discuss the methodological approach taken in this study. In the fourth section, we present the results of the empirical study. In the remaining sections, we analyze the results and discuss the implications to academia and practice.

## CONSUMER BEHAVIOR AND CONSUMER VALUES IN MOBILE COMMERCE CONTEXT

Consumer behavior has been described as a choice between different product and service alternatives (Ajzen and Fishbein 1980). Various motives have been proposed to explain different consumer behaviors, and these motives have primarily been derived from the perceived values that users/consumers derive from a product and/or its service attributes (Koo 2009). In addition to individual, consumer decision making involves many environmental factors that lie outside the control of the individual: social, business, cultural, and economical factors—all affect the consumers' stimuli and attention (Foxall 2005). Furthermore, consumers' choice criterion has also been found to be influenced by prior knowledge and experience (Bettman and Park 1980).

In the mobile commerce context, several studies have examined the adoption of mobile technologies and services. These studies have mainly relied on Technology Acceptance Model (TAM) (Davis 1989) and innovation diffusion theory (Rogers 2003) to provide ways of explaining mobile service adoption and use (Bruner and Kumar 2005; Sia et al. 2004). However, in addition to willingness to use the new technology or mobile channel as such, the value perceived by consumers has been defined to include a wide array of aspects that are related to users' motivations to use the mobile service (Pihlström 2007). Furthermore, the context-specific conditions under which services are used through the mobile channel have been confirmed to be essential factors in deriving perceived value (Mallat et al. 2009; Pihlström and Brush 2008). As Bouwman et al. (2008) maintain, we cannot understand the actual and future use of mobile technologies and services unless we take the subtleties and usability of services, i.e., the specific characteristics, and users' values of the services involved, into account. Also, a study by Pihlström and Brush (2008) shows that in a mobile service context, a multidimensional view of value is necessary.

The perceived value of a mobile product or service incorporates not only utilitarian aspects (also reflected by the usefulness or relative advantage constructs), but also hedonic, emotional aspects of experiential use (Pihlström 2007). Earlier research has found major differences between the perceived utilitarian and the hedonic values also in the context of digital games (Davis 1989; Raessens and Goldstein 2005), and most often, digital games are assumed to be high on the hedonic value (Batra and Ahtola 1990; Chen 2007; Hirschman and Holbrook 1982; Hsu and Lu 2005; Voss et al. 2003). A survey of 576 online game players showed that intention to play online games is influenced by multidimensional intrinsic experiential motives of perceived enjoyment, escape, and social affiliation (Koo 2009). In another empirical study of 579 mobile service users, the most important difference between entertainment and information service users' post-purchase behavior was that entertainment service users' continuous service use is primarily influenced by emotional value, in contrast to information service users' behavior, which is principally influenced by convenience value (Pihlström and Brush 2008). In other words, perceptions of pleasure and enjoyment are critical to consumers' mobile service usage behavior (Hong et al. 2008). Moreover, the general importance of social and identity-related influences in mobile technology and services adoption has been stressed by a number of studies (see e.g., Hong et al. 2008; Pihlström 2007; Thorbjornsen et al. 2007).

Businesses frequently use the concept of a value proposition to characterize the combination of end-result benefits and price to a prospective customer from purchasing a particular product. A customer will choose the competing product, or no product, that offers the best value, meaning the best combination of benefits and price (Keeney

1999). Three steps are distinguished to address the complexities of asking customers about their values. The steps are

- (1) develop a list of customer values
- (2) express each value in a common form
- (3) organize the values to indicate their relationships

Fundamental objectives are fundamental to the decision to purchase over the Internet. To a customer, the decision about whether to purchase over the Internet can be made with only knowledge of how well the alternatives perform in terms of the fundamental objectives. Means objectives are important because they suggest numerous mechanisms for how companies can improve their product or delivery system for customers. Keeney (1999) suggested that that means objectives can be distinguished from fundamental objectives by asking the "Why is that important?" question. For each identified objective, there are two types of possible responses: (1) this objective is one of the essential reasons for interest in the situation (fundamental objective), and (2) this objective is important because of its implication for some other objectives (means objective).

## **METHODOLOGY AND EMPIRICAL STUDY**

In this study, we were interested in exploring the characteristics of Finnish mobile game consumers. What kind of values, needs, and objectives are related to the mobile games and their purchase process for these gamers? To find answers to these questions, we designed an Internet survey instrument based on earlier research on Keeney's value based framework (e.g., Keeney 1999; Siau et al. 2004), as well as studies on mobile commerce and entertainment (e.g., MacInnes et al. 2002). The survey instrument included demographic questions, propositions on values and barriers related to mobile games (measured on LIKERT scale from 1 to 7), as well as open-ended questions.

### **Instrument development**

In designing the instrument, we started the process by defining the decision context, which in this case is "whether or not to buy a mobile game." We searched the literature for constructs to be used in the questionnaire (e.g., Gummerus et al. 2004; Keeney 1999; Pihlström 2007; Pura 2005; Siau et al. 2004). From those studies, we gathered constructs related to the consumer values on mobile games. As a result of this literature review, we formulated an initial questionnaire. This initial questionnaire was then sent out to experts for a review in order to complete and validate the questionnaire instrument from a practitioner point of view. The group of experts included teleoperators, mobile game developers, and a handset manufacturer. During this round of expert revision, two or three questions were added and the phrasing of some of the questions was modified. After the expert revision, we wanted to make sure that the questionnaire was scientifically rigorous. Therefore, we summoned a group of researchers (two ISS professors, one ISS assistant professor and four Ph.D. students) to test the questionnaire. During the focus group, two or three questions were modified. The final set of sixty-two constructs (twenty-five fundamental objectives and thirty-seven means objectives) can be found in Appendix 1.

Finally, we added introductory text to the questionnaire and created an Internet survey instrument, which was uploaded to a mobile gaming portal website. The development and design of the instrument is reported in more detail in (Vihinen 2007) and (Sylvander 2008).

### **Data collection**

The survey was conducted with a questionnaire, which included a total of ninety-six questions (seventy-seven structured and nineteen open). The survey was administered on the Internet on a mobile game portal of a major Finnish telecom operator. During the three-week period in the spring of 2004 when the survey was open to visitors, we received 1,128 responses, of which 714 were usable (all questions answered).

As could be expected, the majority of the respondents were male (82 percent) and twenty-five years or under (72 percent) (See Table 1). The young average age of our sample was highlighted by the fact that the phone bill is paid by the parents for as many as 42 percent of the respondents. There seems to be a clear difference between those who play mobile games and those who play computer games: according to Entertainment Software Association (ESA 2005), as much as 43 percent of computer gamers are female, while also the average age is higher at thirty years.

By placing the Internet survey on a game portal site of a telecom operator, we were able to make sure that enough of the respondents had some experience with mobile games: 95 percent of the respondents reported having played mobile games.



Table 1: Demographics of the Respondents (n = 714)		
<b>Gender</b>	Male	82.5% (589)
	Female	17.5% (125)
<b>Age</b>	Under 11	1.5% (11)
	11–15	22.2% (159)
	16–20	29.6% (211)
	21–25	21.8% (156)
	26–30	10.6% (76)
	31–40	11.2% (80)
	Over 40	2.9% (21)
<b>Education</b>	Elementary school / high school	53.1% (379)
	Secondary school	19.7% (141)
	University	19.3% (138)
	College	7.8% (56)
<b>Profession</b>	Student	56% (400)
	Employee	12.2% (87)
	Clerical employee	5.3% (38)
	Expert	5.2% (37)
	Higher clerical employee	3.2% (23)
	Executive	1.8% (13)
	Entrepreneur	1.5% (11)
	Other	14.7% (105)
<b>Who pays the bill?</b>	Personally/spouse	51% (364)
	Parents	41.7% (298)
	Employer	7.3% (52)

### Principal component analysis

The initial set included sixty-two items (twenty-five fundamental objectives and thirty-seven means objectives), and our objective was to first reduce the number of variables by using principal component analysis. Therefore, we conducted a principal component analysis to each set of items (fundamental and means objectives) separately. Principal component analysis is a widely applied method for reducing the number of variables and generally requires large amounts of data. Typically, the method requires at least four observations per variable used in the analysis (Malhotra and Birks 2007). In this case, this requirement is met, as the total number of observations is 714.

The suitability of the data for the use of principal component analysis can be tested statistically. We ensured the usability of factoring with Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. This test resulted in .930 for fundamental objectives and in .886 for means objectives. KMO values over 0.6 are generally considered suitable for the use of principal component analysis. The Barlett's test of sphericity gave the significance level of .000 for both sets. Based on the above, we argue that principal component analysis can be applied to the data.

The reliability scores (Cronbach's alpha) for each of the components are presented in the following tables (Table 2 and Table 3).

Table 2: Fundamental Objectives (25 items, n = 714)		
Component	No. of items	Alpha
Satisfaction of quality expectations	11	0,95
Gaming experience	6	0,80
Ease and quickness of setup	6	0,77
Social aspects	2	0,65

<b>Component</b>	<b>No. of items</b>	<b>Alpha</b>
Audiovisual effects	9	0,86
Shopping and services	8	0,85
Customer support	5	0,89
Product information	6	0,81
Trust	5	0,73
Trialability	4	0,81

### Cluster analysis

We conducted a cluster analysis using the identified fundamental objectives to identify different groups of mobile game players and to be able to define the distinguishing features between them. As a basis for the analysis, we used the results of the principal component analysis by calculating standardized principal component scores for each respondent. As a clustering method, we chose to use nonhierarchical clustering and the K-means algorithm, which is less sensitive to outliers and more suitable for handling larger sets of data than the hierarchical clustering (Shmueli et al. 2007).

## FINDINGS OF THE EMPIRICAL STUDY

### Fundamental objectives

In the case of fundamental objectives, the initial set of items included twenty-five constructs (see Appendix 1), each measured on a LIKERT 1–7 scale. We conducted a principal component analysis with varimax rotation to reduce the number of variables to a set of easily identifiable dimensions.

We chose to select the solution where the principal components had Eigenvalues of over 1. This resulted in the use of four components, which explained 60.14 percent of the variance in the sample. The components that emerged from this analysis were all easily identifiable. Table 4 presents the Eigenvalues of the four components. The loadings of the solution with four components are presented in Table 5.

<b>Component</b>	<b>Total</b>	<b>% of variance</b>	<b>Cumulative %</b>
1	9.84278658	39,37%	39,37%
2	2.34187463	9,37%	48,74%
3	1.56128987	6,25%	54,98%
4	1.28909763	5,16%	60,14%

The fundamental objectives that were loaded into the first principal component, Satisfaction of quality expectations, were those that are related to high quality and good price/quality ratio of the product. The results indicate that consumers evaluate the quality of a game based on how well it responds to their expectations and how well it functions on a mobile phone. This is in line with Juran (1989), who defines the quality of a good based on its suitability for the purpose of use.

The second principal component, Gaming experience, is interesting, as no comparable category can be found in earlier studies based on Keeney's (1999) framework. Nonetheless, in other studies, for instance those based on Technology Acceptance Model (TAM) (Davis 1989), a similar category has been identified (see e.g., Hsu and Lu 2004). These studies have shown that gaming experience or the flow theory and particularly the GameFlow model (Sweetsner and Wyeth 2005) can be used to explain the interest of consumers to play Internet games.

The third component, Ease and quickness of setup, includes the fundamental objectives related to ease and quickness of the ordering and delivery processes. Similar results have been reported for studies looking into the benefits of Internet-based electronic commerce as compared to traditional brick-and-mortar commerce (e.g., Torkzadeh and Dhillon 2002).

Just like the second principal component, also the fourth one, Social aspects, is new when compared to earlier studies based on Keeney's (1999) work. However, similar factors have been reported to be significant in other types of studies. For example, using a TAM model, Kleijnen et al. (2004) recognized the importance of opinions of friends in the context of attitudes toward and willingness to use mobile financial services.



**Table 5: Rotated Factor Pattern (Fundamental Objectives)**

Item	PC1	PC2	PC3	PC4
<b>Satisfaction of quality expectations</b>				
Mobile game corresponds to the advertisement of the game.	<b>0,71</b>	0,17	0,30	0,03
Mobile game is well produced.	<b>0,84</b>	0,11	0,15	0,04
Price/quality ratio of the mobile game is good.	<b>0,80</b>	0,12	0,21	-0,02
It is easy to play the mobile game using the mobile phone's keypad.	<b>0,74</b>	0,23	0,31	0,03
Mobile game corresponds to my expectations.	<b>0,75</b>	0,14	0,28	0,07
Quality of the mobile game is good.	<b>0,78</b>	0,14	0,13	0,15
The playability and gaming experience of the game is adequate.	<b>0,83</b>	0,15	0,14	0,08
Game functions well on a mobile phone.	<b>0,81</b>	0,13	0,23	0,00
Mobile game fits to the mobile phone's small screen.	<b>0,68</b>	0,11	0,20	0,08
Mobile game's functionality is good.	<b>0,75</b>	0,18	0,20	0,03
Mobile game is meaningful.	<b>0,71</b>	0,20	0,16	0,09
<b>Gaming experience</b>				
Playing the mobile game requires intelligence and reflection.	0,42	<b>0,48</b>	-0,12	0,01
Playing the mobile game requires the use of reflexes and cleverness.	0,29	<b>0,69</b>	-0,06	0,12
Objective in the mobile game is getting a high score.	0,01	<b>0,77</b>	0,17	0,09
High scores can be compared in the hall of fame.	-0,03	<b>0,75</b>	0,22	0,07
Gamer can reach the next level only after completing the previous level.	0,21	<b>0,64</b>	0,17	0,02
Length of the mobile game depends on the gamer's own skills.	0,28	<b>0,66</b>	0,11	0,05
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Length of the mobile game depends on the gamer's own skills.	0,28	<b>0,66</b>	0,11	0,05
<b>Ease and quickness of setup</b>				
Mobile game seems interesting.	0,35	-0,10	<b>0,35</b>	0,22
It is easy to choose a mobile game.	0,07	0,22	<b>0,56</b>	0,25
Mobile game is inexpensive.	0,40	0,07	<b>0,42</b>	0,01
It is easy to order the mobile game.	0,39	0,15	<b>0,70</b>	-0,03
Mobile game is quickly delivered.	0,27	0,11	<b>0,72</b>	0,10
It is easy to install the mobile game.	0,36	0,14	<b>0,75</b>	-0,02
<b>Social aspects</b>				
Friends have recommended the mobile game.	0,02	0,16	0,11	<b>0,82</b>
Mobile game has received good reviews (e.g. in game magazines or web sites).	0,14	0,09	0,08	<b>0,83</b>

**Means objectives**

In the case of means objectives, the initial set of items included thirty-seven constructs (see Appendix 1), each measured on a LIKERT 1–7 scale. As with the fundamental objectives, we conducted a principal component analysis with varimax rotation to reduce the number of variables to a set of easily identifiable dimensions.

We chose to select the solution where the principal components had Eigenvalues of over 1. This resulted in the use of six components, which explained 57.87 percent of the variance in the sample. The components that emerged from this analysis were all easily identifiable. The following table presents the Eigenvalues of the six components.

**Table 6: Eigenvalues for Means Objectives**

Component	Total	% of variance	Cumulative %
1	10.4730631	28,31%	28,31%
2	3.7564234	10,15%	38,46%
3	2.3371861	6,32%	44,77%
4	1.8470949	4,99%	49,77%
5	1.6129946	4,36%	54,13%
6	1.3851147	3,74%	57,87%

The loadings of the solution with six components are presented in the following table.

<b>Table 7: Rotated Factor Pattern (Means Objectives)</b>						
Item	PC1	PC2	PC3	PC4	PC5	PC6
<b>Audiovisual Effects</b>						
Mobile game uses a lot of colors.	<b>0,74</b>	0,20	0,10	0,05	0,15	0,02
Mobile game is three-dimensional.	<b>0,82</b>	0,05	0,09	-0,09	0,19	0,10
Mobile game has good graphics.	<b>0,75</b>	0,25	0,06	0,14	0,05	0,10
Mobile game uses a lot of sounds.	<b>0,84</b>	0,04	0,04	0,06	0,14	0,07
Mobile game includes good music.	<b>0,80</b>	0,05	0,13	0,07	0,13	0,05
Playing the mobile game requires no instructions.	<b>0,44</b>	0,11	0,19	-0,03	0,29	0,00
Mobile game has a multi-player mode.	<b>0,39</b>	0,09	0,22	0,07	0,12	0,14
A computer/game console version of the mobile game is available.	<b>0,42</b>	-0,19	0,14	-0,09	0,42	0,32
Game can be ordered through a wap-menu.	<b>0,37</b>	0,26	0,13	-0,08	0,35	0,28
<b>Shopping and Services</b>						
The publisher of the mobile game is reliable.	0,10	<b>0,63</b>	0,17	0,21	0,35	-0,04
Game can be suspended and continued later.	0,36	<b>0,54</b>	0,16	0,23	-0,12	0,08
Ordering instructions are easy to find.	0,14	<b>0,59</b>	0,24	0,19	0,15	0,14
Mobile game functions in a faultless manner.	0,03	<b>0,75</b>	0,12	0,32	-0,04	0,07
The ordering process of the mobile game is reliable.	0,07	<b>0,76</b>	0,20	0,25	0,05	0,08
Game can be ordered using text-messaging.	0,32	<b>0,42</b>	0,16	-0,05	0,28	0,29
A mistakenly ordered game can be returned.	0,21	<b>0,55</b>	0,20	0,06	0,10	0,29
Mobile game can be paid on the mobile phone bill.	0,12	<b>0,59</b>	0,07	-0,01	0,24	0,24
<b>Customer Support</b>						
Customer support services are of good quality.	0,15	0,14	<b>0,81</b>	0,12	0,11	0,11
Customer support services are inexpensive.	0,10	0,18	<b>0,82</b>	0,12	0,04	0,05
Customer support services are easily available.	0,14	0,20	<b>0,87</b>	0,11	0,05	0,10
Customer support services are available through Internet.	0,08	0,25	<b>0,73</b>	0,21	0,07	0,07
Customer support services are available through phone.	0,28	0,08	<b>0,69</b>	-0,02	0,17	0,20
<b>Product Information</b>						
Information about the mobile game is available before purchase.	-0,05	0,21	0,01	<b>0,71</b>	-0,03	0,12
Advertisement of mobile game is explicit.	0,26	-0,01	0,09	<b>0,47</b>	0,25	0,06
Information about the mobile game is quickly available.	-0,02	0,14	0,17	<b>0,74</b>	0,19	0,13
Information about the mobile game is available through multiple sources.	0,08	0,07	0,11	<b>0,70</b>	0,20	0,16
Mobile game functions reliably in the customer's specific phone.	-0,01	0,42	0,03	<b>0,60</b>	-0,13	0,15
Information about the mobile game is reliable.	0,00	0,28	0,19	<b>0,64</b>	0,02	0,25
<b>Trust</b>						
Mobile game can be paid using e-banking.	0,06	0,24	0,09	0,09	<b>0,44</b>	0,15
The carrier of the mobile game is well-known.	0,18	0,28	0,17	0,08	<b>0,76</b>	-0,04
The developer of the mobile game is a well-known company.	0,26	0,23	0,13	0,08	<b>0,76</b>	-0,04
Mobile game is a classic.	0,17	-0,15	0,01	0,10	<b>0,61</b>	0,18
Mobile game is the best in its class.	0,24	0,01	-0,07	0,21	<b>0,44</b>	0,24
<b>Trialability</b>						
Mobile game can be tested before purchase (demo-versions).	0,07	0,21	0,10	0,16	0,09	<b>0,75</b>
Mobile game can be compared with other games before purchasing.	0,13	0,06	0,17	0,26	0,16	<b>0,72</b>
One can familiarize oneself with the mobile game before purchase.	0,05	0,27	0,13	0,29	0,08	<b>0,73</b>
Getting to know the mobile game is fun.	0,26	0,19	0,09	0,32	0,08	<b>0,50</b>



The means objectives that were loaded into the first principal component, Audiovisual Effects, were those related to the graphics and sound attributes of the mobile games. The results indicate that certain flamboyance and pleasing sound effects are of importance to the consumers of mobile games. These features are, however, still somewhat difficult to be improved in the case of mobile games because of the limitations of current mobile devices.

The second component includes items related to shopping experience and additional services. Therefore, we named the component Shopping and Services. The items in the component recognize the significance of the objectives related to the mobility of the purchasing process, enabling the consumers to purchase the game with the mobile device alone, that is, without, for instance, a computer for downloading the game or a credit card for paying for it. The mobility of the process also responds to the fundamental objectives of ease of use and effectiveness of the game.

Five objectives related to the availability and speed of customer support services loaded to the third principal component, which we named Customer Support. Similar results have been obtained in earlier studies (e.g., Siau et al. 2004).

The fourth component was named Product Information, as it contains means objectives related to quick and reliable product information. This component is rather intuitive and has been found in most studies based on Keeney's (1999) framework.

Similarly, Trust toward different stakeholders, as in our fifth component, has been identified to have had great importance in a number of earlier studies (e.g., Siau et al. 2004;Torkzadeh and Dhillon 2002).

All the means objectives related to the possibilities to compare the game with others as well as to try the game out before purchasing, were loaded into the sixth component, Trialability. The objectives related to the possibilities to compare similar products and services have also been identified in other studies related to mobile commerce (e.g. Siau, et al. 2004).

**Cluster analysis**

In addition to the method being used, the number of clusters to be used has an impact on the results of the cluster analysis (Malhotra and Birks 2007). To decide on the number of desired clusters, we looked at how the relative number of responses varies by changing the number of clusters. The purpose of this process was to find the optimal number, which generates groups with acceptable number of observations. Experimenting with four to six clusters, the prerequisite of sufficient number of observations was satisfied with four clusters.

We performed the cluster analysis on the basis of the fundamental objectives. The following table presents the cluster means for each of the four principal components of fundamental objectives.

**Table 8: Cluster Means of Principal Fundamental Objectives**

	<b>Demanding Customers</b>	<b>Game Enthusiasts</b>	<b>Demanding Gamers</b>	<b>Casual Gamers</b>
Satisfaction of quality expectations	0,404	0,072	0,518	-2,190
Gaming experience	-0,972	0,506	0,713	-0,273
Ease and quickness of setup	0,058	0,424	-0,876	-0,795
Social aspects	-0,244	0,487	-1,165	0,115

Looking at the average playing times for the four identified clusters we can see that groups 2 (Game Enthusiasts) and 3 (Demanding Customers) play more mobile games on average than the other groups. When looking at the average weekly playing times for all types of digital games, the differences are smaller (see Table 9).

**Table 9: Average Weekly Playing Times by Clusters**

		n	mobile games: average weekly playing time (mins.)	all games: average weekly playing time (mins.)
1	Demanding Customers	219 (31%)	71	486
2	Game Enthusiasts	324 (45%)	111	570
3	Demanding Gamers	97 (14%)	128	492
4	Casual Gamers	74 (10%)	76	420
	Total	714	98	518

To understand these for groups as buyers and players of mobile games, we looked at the means for both fundamental and means components for these four groups.

**Table 10: Means of Principal Components by Clusters**

<b>Components based on Means objectives</b>	<b>Demanding Customers</b>	<b>Game Enthusiasts</b>	<b>Demanding Gamers</b>	<b>Casual Gamers</b>
Audiovisual effects	3,93	5,17	4,47	3,89
Shopping and Services	5,83	6,20	5,70	3,98
Customer support	5,08	5,67	5,28	4,12
Product information	5,33	5,70	4,85	3,95
Trust	4,03	4,99	3,90	3,77
Trialability	4,90	5,52	4,70	3,76
<b>Components based on Fundamental objectives</b>	<b>Demanding Customers</b>	<b>Game Enthusiasts</b>	<b>Demanding Gamers</b>	<b>Casual Gamers</b>
Satisfaction of quality expectations	6,21	6,31	6,33	3,86
Gaming experience	4,01	5,54	5,53	3,91
Ease and quickness of setup	5,62	6,06	5,03	3,98
Social aspects	4,06	5,36	3,01	4,22

The Demanding Customers and the Demanding Gamers share a fairly similar profile. The difference seems to be that the Demanding Customers are more interested in the total customer experience and service, whereas the Demanding Gamers place more emphasis on the actual playing.

For the Game Enthusiasts, the biggest group (45 percent) in our sample, value almost each and every aspect of both buying a mobile game and playing it. Of all the groups, these gamers place the highest importance on audiovisual effects of mobile games.

The Casual Gamers form the smallest group (10 percent) in our samples, which is not surprising considering the fact that the survey was administered on a mobile game portal on the Internet. None of the components received high values from this group, indicating their general indifference toward mobile gaming. Of the components based on fundamental objectives, the customer support is most valued by this group. Of the components based on means objectives, the most important for these gamers are the social aspects of gaming.

## DISCUSSION

In this paper we used the value-focused model (Keeney 1999) and examined the objectives of mobile gamers when choosing games. However, it was discovered that the original model is not sufficient on its own to meet the main objective of the study, as it does not provide any information about the consumers and their demographics. Therefore, a principal component analysis followed by a cluster analysis was utilized, as well. We modified Keeney's method by replacing the group interviews with an Internet-based survey that was considered to be the best alternative to reach and study mobile game consumers.

Using principal component analysis both for the fundamental and means objectives we found four fundamental objectives for games:

1. *Satisfaction of quality expectations*
2. *Gaming experience*
3. *Ease of setup*
4. *Social aspects of games*

The means to achieve these fundamental objectives were:

1. *Audiovisual effects*
2. *Shopping and Services*
3. *Customer Support*
4. *Product Information*
5. *Trust*
6. *Trialability*



These items are important for players, but their importance varies according to the types of players. We could cluster the users into four clearly identifiable groups that differ in their gaming needs and expected shopping experience.

The first group, which we call Demanding Customers, place emphasis on total customer experience in the whole process from finding product information to buying, ease of setup, and satisfaction with the overall experience. The second group, Game Enthusiasts, also values the overall experience, but they expect to be able to try the game in advance and want its ambience and effects to be the best possible. Furthermore, they value the social aspects of gaming. Demanding Gamers expect things to work well in the buying process, but they are mostly concerned about the quality and playability of the games. The final group, Casual Gamers, value customer support and social aspects of gaming, but are less worried about audiovisual effects or trialability of the games.

These results add to the previous research on mobile gaming (Anckar and D'Incau 2002; Barnes 2002; Pura 2005; Shen et al. 2005; Siau et al. 2004) that has been based mainly on TAM and its variants (e.g., Pihlström 2007; Scornavacca et al. 2006). We argue that our approach based on value-focused thinking outperforms earlier models and frameworks in explaining consumer values and the choice behavior of buyers in the context of mobile games. The identification of fundamental and means objectives provides a fresh insight into why and how players choose games. We did not make a distinction between hedonic and utilitarian values, which has been noted elsewhere (Pihlström and Brush 2008). Many of our identified objectives can be seen as utilitarian (e.g., ease of setup, customer support), but hedonic values are visible as well (audiovisual effects, gaming experience). The trust objective can be seen as similar to commitment in previous research (Pura 2005). Social value of mobile services has been identified before (Pura 2005), but the importance of social aspects of games especially for casual gamers is an interesting new insight here.

Customers perceive the value of products and services differently based on their personal values, needs, and preferences (Ravald and Grönroos 1996). The identification of recognizable clusters mobile game of players aids in understanding the differences between different types of players with markedly different game selection and buying patterns. Our clustering shows that Game Enthusiasts, who spend a lot of time playing games on all kinds of platforms, value game offerings very differently than Casual Gamers do. We argue that this indicates that new entrants in the mobile game market have possibilities to compete if they keep their quality high and put effort into improving the ease of shopping and ease of setup.

## CONCLUSIONS

In this paper, we set out to explore the customer values, needs, and objectives related to the purchasing process of mobile games. Based on the analysis of existing theories, Keeney's (1999) value-focused thinking turned out to be the most suitable theoretical lens to identify the needs of mobile game consumers in general. We used it to identify fundamental and means objectives of mobile gamers by performing a survey of players in a mobile gaming portal.

The results are interesting for practitioners and researchers. They point out that mobile gamers are a heterogeneous group and they seek different experiences from games and value different features of games and game shopping. This should be taken into account when designing and marketing new mobile games. Previous research on game design has discussed the role of players in game design (Ermi and Mäyrä 2007). Our study deepens this discussion by identifying values and intentions of players, which can be used as contextual guides for designing games. For example, demanding gamers value audiovisually stunning games and place requirements for both mobile devices and the games developed. Casual gamers are more interested in being able to play socially and perhaps they are a little less demanding about the console-like game experience. Demanding gamers are willing to pay for games that they have tried and found to their liking, whereas casual gamers probably want games that are so cheap and small that they do not need to think too much about the purchase decision.

This study is exploratory in nature, and thus we refrain from making strong conclusions on the findings. The main limitations of this study come from the sample that is taken from a mobile gaming site, which on one hand has a population that contains a high proportion of game enthusiasts and by definition most site users are mobile gamers. The relative newness of the phenomenon dictates this, as if we drew a sample from general population, most responders would not have anything to say about mobile games.

Much more research is needed to reveal the needs and values of mobile gamers, but we believe that this is an important first step, as the needs of different customer groups are different to a degree that designers have to target their gamers for different gamer groups. In the future it would be interesting to study the differences in values of especially game enthusiasts and casual gamers and what are the key design dimensions for each group.

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## REFERENCES

- Ajzen, I., and M. Fishbein, *Understanding Attitudes and Predicting Social Behavior*, Upper Saddle River, NJ: Prentice-Hall, 1980.
- Anckar, B., and D. D'Incau, "Value creation in mobile commerce: Findings from a consumer survey," *Journal of Information Technology Theory and Application*, 2002, 4:1, pp. 43–64.
- Barnes, S., "The mobile commerce value chain: Analysis and future development," *International Journal of Information Management*, 2002, 22:2, pp. 91–108.
- Batra, R., and O.T. Ahtola, "Measuring the hedonic and utilitarian sources of consumer attitudes," *Marketing Letters*, 1990, 2:2, pp. 159–170.
- Bell, M., M. Chalmers, L. Barkhuus, M. Hall, S. Sherwood, P. Tennent, B. Brown, D. Rowland, S. Benford, M. Capraand, and A. Hampshire, "Interweaving Mobile Games with Everyday Life", In *Proceedings of the SIGCHI conference on Human Factors in computing systems*, ACM, Montréal, Québec, Canada, 2006, pp. 417–426.
- Bettman, J.R., and C.W. Park, "Effects of prior knowledge and experience and phase of the choice process on consumer decision processes: A protocol analysis," *Journal of Consumer Research*, 1980, 7:3, pp. 234–248.
- Bouwman, H., et al., "Trends in mobile services in Finland 2004–2006: From ringtones to mobile Internet," *Info*, 2008, 10:2, pp. 75–93.
- Bruner, G.C.I., and A. Kumar, "Explaining consumer acceptance of handheld Internet devices," *Journal of Business Research*, 2005, 58:5, pp. 553–558.
- Chen, J., "Flow in games (and everything else)," *Communications of the ACM*, 2007, 50:4, pp. 31–34.
- Davis, F.D., "Perceived usefulness, perceived ease of use, and user acceptance of information," *MIS Quarterly*, 1989, 13:3, pp. 319–340.
- Ermi, L., and F. Mäyrä, "Fundamental components of the gameplay experience: Analysing immersion," In *Worlds In Play: International Perspectives on Digital Games Research*, Castell, S.D., and J. Jenson (eds.), Peter Lang Publishers, New York, 2007, pp. 37–53.
- ESA, "Essential facts about the computer and video game industry," *E.S.A.*, 2005, <http://www.theesa.com>, last retrieved 18.4.2008.
- Foxall, G.R., *Understanding Consumer Choice*, New York: Palgrave Macmillan, 2005.
- Fritsch, T., R.H. and J. Schiller, "Mobile phone gaming (a follow-up survey of the mobile phone gaming sector and its users)," In *Entertainment Computing—ICEC 2006*, 4161, Springer Berlin/Heidelberg, 2006, pp. 292–297.
- Gengler, C.E., and T.J. Reynolds, "Consumer understanding and advertising strategy: Analysis and translation of laddering data," *Journal of Advertising Research*, 1995, 35:4, pp. 19–33.
- Gummerus, J., et al., "Customer loyalty to content-based web sites: The case of an online health-care service," *Journal of Services Marketing*, 2004, 18:3, pp. 175–186.



- Han, S.-Y., M.-K. Cho, and M.-K. Choi, *Ubitem: A Framework for Interactive Marketing in Location-based Gaming Environment*, Sydney, Australia, 2005, pp. 103–108.
- Hirschman, E.C., and M.B. Holbrook, "Hedonic consumption: Emerging concepts, methods and propositions," *Journal of Marketing*, 1982, 46:Summer, pp. 92–101.
- Hong, S.-J., et al., "Understanding the behavior of mobile data services consumers," *Information Systems Frontiers*, 2008, 10, pp. 431–445.
- Hsu, C.-L., and H.-P. Lu, "Consumer behavior in online game communities: A motivational factor perspective," *Computers in Human Behavior*, 2005, 23:3, pp. 1642–1659.
- Hsu, C.-L., and H.P. Lu, "Why do people play on-line games? An extended tam with social influences and flow experience," *Information & Management*, 2004, 41:7, pp. 853–868.
- Juran, J.M., *Juran on Leadership for Quality*, New York: Free Press, 1989.
- Keeney, R.L., "The value of Internet commerce to the customer," *Management Science*, 1999, 45:4, pp. 533–542.
- Kelly, G.A., *Psychology of Personal Constructs*, New York: W.W. Norton and Co., 1955.
- Kleijnen, M., M. Wetzels, and K. De Ruyter, "Consumer acceptance of wireless finance," *Journal of Financial Services Marketing*, 2004, 8:3, pp. 206–217.
- Koo, D.-M., "The moderating role of locus of control on the links between experiential motives and intention to play online games," *Computers in Human Behavior*, 2009, 25:2, pp. 466–474.
- MacInnes, I., et al., "Business models for mobile content: The case of m-games," *Electronic Markets*, 2002, 12:4, pp. 218–227.
- Malhotra, N., and D. Birks, *Marketing Research: An Applied Approach*, Prentice Hall, Harlow, 2007.
- Mallat, N., et al., "The impact of use context on mobile services acceptance: The case of mobile ticketing," *Information & Management*, 2009, 46:3, pp. 190–195.
- MGAIN, "Mobile entertainment in Europe: Current state of the art," Accompanying Measures project IST-2001-38846, WP3 – Mobile Entertainment Concepts and Culture, Deliverable D3.1.1, 2003.
- Peffer, K., C.E. Gengler, and T. Tuunanen, "Extending critical success factors methodology to facilitate broadly participative information systems planning," *Journal of Management Information Systems*, 2003, 20:1, pp. 51–85.
- Peltola, J., and H. Karsten, "When play is not enough: Towards actually useful applications for digital entertainment," *Proceedings of the Helsinki Mobility Roundtable*, Helsinki School of Economics, Helsinki, Finland, 2006.
- Pihlström, M., "Committed to content provider or mobile channel? Determinants of continuous mobile multimedia service use," *Journal of Information Technology Theory and Application*, 2007, 9:1, pp. 1–23.
- Pihlström, M., and G.J. Brush, "Comparing the perceived value of information and entertainment mobile services," *Psychology & Marketing*, 2008, 25:8, pp. 732–755.
- Pura, M., "Linking perceived value and loyalty in location-based mobile services," *Managing Service Quality*, 2005, 15:6, pp. 509–538.

Raessens, J., and J. Goldstein, *Handbook of computer game studies*, Cambridge, MA: The MIT Press, 2005.

Rajala, R., et al., "Revenue logics of mobile entertainment software—observations from companies producing mobile games," *Journal of Theoretical and Applied Electronic Commerce Research*, 2007, 2:2, pp. 34–47.

Ravald, A., and C. Grönroos, "The value concept and relationship marketing," *European Journal of Marketing*, 1996, 30:2, pp. 19–30.

RCR, "Metrics," *Wireless News*, 2008, 27:39, p. 26.

Rogers, E.M., *Diffusion of Innovations*, New York: Free Press, 2003.

Rybicki, J., "Going mobile," *Electronic Gaming Monthly*, 2009, Jan 2009, p. 236.

Scornavacca, E., S.J. Barnes, and S. Huff, "Mobile business research, 2000–2004: Emergence, current status, and future opportunities," *Communications of the AIS*, 2006, 17:1, pp. 635–646.

Sheng, H., F.-H.F. Nah, and K. Siau, "Strategic implications of mobile technology: A case study using value-focused thinking," *Journal of Strategic Information Systems*, 2005, 14:3, pp. 269–290.

Sia, C.L., et al., "Effects of environmental uncertainty on organisational intention to adopt distributed work arrangements," *IEEE Transactions on Engineering Management*, 2004, 51:3, pp. 253–267.

Siau, K., F. Nah, and H. Sheng, "The value of mobile commerce to customers," In *Proceedings of the Austin Mobility Roundtable*, University of Texas at Austin, Austin, Texas, 2004,

Sweetsner, P., and P. Wyeth, "Gameflow: A model for evaluating player enjoyment in games," *ACM Computers in Entertainment*, 2005, 3:3, pp. 1–24.

Sylvander, S., "Mobiilipelit—kuluttajaa etsimässä," Helsinki School of Economics, 2008.

Thorbjornsen, H., P.E. Pedersen, and H. Nysveen, "'This is who I am': Identity expressiveness and the theory of planned behavior," *Psychology & Marketing*, 2007, 24:9, pp. 763–785.

Torkzadeh, G., and G. Dhillon, "Measuring factors that influence the success of Internet commerce," *Information System Research*, 2002, 13:2, pp. 187–204.

Vihinen, J., "Supply and demand perspectives on mobile products and content services," Doctoral Dissertation, Helsinki School of Economics, 2007.

Voss, K.E., E.R. Spangenberg and B. Grohmann, "Measuring the hedonic and utilitarian dimensions of consumer attitude," *Journal of Marketing Research*, 2003, 30:3, pp. 310–320.



## APPENDIX 1: CONSTRUCTS USED IN THE STUDY (62 ITEMS)

### Fundamental objectives (25):

- Mobile game seems interesting.
- It is easy to choose a mobile game.
- Friends have recommended the mobile game.
- Mobile game has received good reviews (e.g., in game magazines or web sites).
- Mobile game is inexpensive.
- It is easy to order the mobile game.
- Mobile game is quickly delivered.
- It is easy to install the mobile game.
- Mobile game corresponds to the advertisement of the game.
- Mobile game is well produced.
- Price/quality ratio of the mobile game is good.
- It is easy to play the mobile game using the mobile phone's keypad.
- Mobile game corresponds to my expectations.
- Quality of the mobile game is good.
- The playability and gaming experience of the game is adequate.
- Game functions well on a mobile phone.
- Mobile game fits to the mobile phone's small screen.
- Mobile game's functionality is good.
- Mobile game is meaningful.
- Playing the mobile game requires intelligence and reflection.
- Playing the mobile game requires the use of reflexes and cleverness.
- Objective in the mobile game is getting a high score.
- High scores can be compared in the hall of fame.
- Gamer can reach the next level only after completing the previous level.
- Length of the mobile game depends on the gamer's own skills.

### Means objectives (37)

- Information about the mobile game is available before purchase.
- Advertisement of mobile game is explicit.
- Information about the mobile game is quickly available.
- Information about the mobile game is available through multiple sources.
- Mobile game can be tested before purchase (demo-versions).
- Mobile game can be compared with other games before purchasing.
- One can familiarize oneself with the mobile game before purchase.
- Getting to know the mobile game is fun.
- Information about the mobile game is reliable.
- A computer/game console version of the mobile game is available.
- Mobile game is a classic.
- Mobile game is the best in its class.
- Ordering instructions are easy to find.
- Game can be ordered through a wap-menu.
- Game can be ordered using text-messaging.
- A mistakenly ordered game can be returned.
- Mobile game can be paid on the mobile phone bill.
- Mobile game can be paid using e-banking.
- The carrier of the mobile game is well-known.
- The developer of the mobile game is a well-known company.
- The publisher of the mobile game is reliable.
- Mobile game uses a lot of colors.
- Mobile game is three-dimensional.
- Mobile game has good graphics.
- Mobile game uses a lot of sounds.
- Mobile game includes good music.
- Game can be suspended and continued later.
- Playing the mobile game requires no instructions.
- Mobile game has a multi-player mode.
- Customer support services are of good quality.
- Customer support services are inexpensive.
- Customer support services are easily available.
- Customer support services are available through Internet.
- Customer support services are available through phone.
- Mobile game functions reliably in the customer's specific phone.
- The ordering process of the mobile game is reliable.
- Mobile game functions in a faultless manner.

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