

2010

# An Exploratory Three Year Segmentation of Finnish Mobile Service Users

Anna Sell

*Åbo Akademi University, anna.sell@abo.fi*

Pirkko Walden

*Åbo Akademi University, pirkko.walden@abo.fi*

Christer Carlsson

*Åbo Akademi University, christer.carlsson@abo.fi*

Follow this and additional works at: <http://aisel.aisnet.org/acis2010>

---

## Recommended Citation

Sell, Anna; Walden, Pirkko; and Carlsson, Christer, "An Exploratory Three Year Segmentation of Finnish Mobile Service Users" (2010). *ACIS 2010 Proceedings*. 85.

<http://aisel.aisnet.org/acis2010/85>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2010 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

## An Exploratory Three Year Segmentation of Finnish Mobile Service Users

Anna Sell, Pirkko Walden and Christer Carlsson  
Institute for Advanced Management Systems Research  
Åbo Akademi University  
Åbo, Finland

Email: [anna.sell@abo.fi](mailto:anna.sell@abo.fi), [pirkko.walden@abo.fi](mailto:pirkko.walden@abo.fi), [christer.carlsson@abo.fi](mailto:christer.carlsson@abo.fi)

### Abstract

*In this study we describe users of mobile phones and mobile services, based on three random samples from the years 2007, 2008 and 2009 which are valid representations of the Finnish general population. We carried out a detailed analysis of the sample for 2009 and used the results to do a first exploratory segmentation of Finnish mobile service users. Then we wanted to find out if the same segments could be found in the 2007 and 2008 samples as well or if there has been some evolution in the formation of user categories. The findings are potentially important both as mobile service providers do not appear to pay attention to the consumer segments and as changes in the major segments offer opportunities for either successes or disasters in the mobile services market. We add to the body of knowledge on mobile services as the results we have and the methods we use can be benchmarked in other countries and comparisons can contribute to a general understanding of the demand for mobile services.*

### Keywords

Mobile services, mobile phone users, attitude(s), lifestyle segmentation, factor analysis

### INTRODUCTION

There has been a lot of discussion why certain mobile services have not been successful in the European markets, even if the devices making them possible are finding their way to consumers. Year after year the mobile service market(s) produce(s) new services and applications that due to complexity or lack of relevance fail to meet the consumers' expectations. Also many of these services seem to be mere extensions of the original services than true innovations. Although there have been many relevant initiatives, developments in mobile services in Finland have during the last few years slowed down compared to many other countries, for example Japan, Korea and Italy (e.g. Carlsson et al. 2005, Bouwman et al 2009). Fewer risks are being taken in the development and marketing of new services. Due to regulatory reform (number portability led to lower entry barriers for new entrants, higher churn-rates and eroding prices) and growing overcapacity (indicated by a rapidly decreasing average revenue per user) has contributed to Finland being considered to be a difficult market (Viestintävirasto 2008).

We have carried out studies with Finnish mobile service users since 2003 and now we have started to question whether the mobile service developers/providers understand the role of mobile services in the daily lives of consumers? Understanding consumer behaviour is critical but it seems as the mobile service developers/providers have not paid enough attention to defining their market nor have they built a sufficient understanding of consumers. A market is "a group of people who share a similar need" (Kotler 1991 p. 29). Therefore it is important to define the target markets, and to develop mobile services tailored to each selected segment. In order to be able to do this information about what influences the consumer behaviour is needed. Kiljander (2004) found that in the 1990s the mobile phone manufacturers were mainly targeting consumers with no previous experience with mobile phones. Since then different ways of categorizing users have been tried but something has apparently gone wrong. Mazzoni et al (2007) found that a partial explanation may be that telecommunication companies have been satisfied with simple segmentation methods that rely on limited sets of variables that have been easy to collect and interpret but which have not been very informative or useful.

The aim of this paper is to categorize Finnish mobile service users based on their activities, interests and opinions and provide some insight/guidance on how mobile service customers could be targeted. With the type of lifestyle research we have carried out it is possible to explain behaviour and possible buying activities, which in turn can support target marketing programs (Orth et al. 2004).

The paper is structured in the following way: In the following section we first present previous research on categorizing users of mobile devices and services. We then go on to present the surveys we have carried out and our sample and data collection procedures. This is followed by data analysis, starting with exploratory factor analysis identifying factors during the three years which can be used to identify segments of mobile service consumers. The segments we have found are worked out in detail for year 2009 (Sell et al 2010); then we wanted to find out if the same segments could be found in the 2007 and 2008 samples as well, or if there has been some evolution in

the formation of user categories, and we made a first exploratory analysis of the 2007 and 2008 data. The paper ends with some conclusions and some managerial implications that we could formulate based on our results.

## BACKGROUND

Segmentation has been one of the most researched topic in the marketing literature. The concept of market segmentation was first introduced by Smith in the late 1950s According to Smith market segmentation involves “viewing a heterogeneous market as a number of smaller homogeneous markets, in response to differing preferences, attributable to the desires of consumers for more precise satisfaction of their varying wants”. Frank, et al published a classical book on market segmentation in 1972 where they distinguished two schools, one having its foundation in microeconomic theory and the other in the behavioural science. Wedel and Kamakura (2001) applying the Frank et al (1972) approach, present the classification of segmentation bases: (i) general versus product-specific and (ii) observable versus unobservable.

Our approach is not a classical one but an exploratory approach to find homogenous user categories within the Finnish mobile phone and service market. Classification of segmentation bases would direct us towards the product-specific (related to both the customer and the product, service and/or particular circumstances) and unobservable (Frank et al 1972). As stressed by Wedel and Kamakura (2001) the identification of market segments and their elements is highly dependent on the basis (variables or criteria) and methods used to define them. Here we are trying to discover the user categories based on psychographic measures; personality traits and lifestyle. We recognize that little is known about the stability of the unobservable product specific bases for segmentation. We do not see it as a problem but assume that segments evolve over time; thus we are here interested in if we can see a shift of user categories during the three consecutive years we are studying.

Several researchers have presented work on how mobile phones and mobile services are used. We will briefly summarize some research on users of mobile services and how they have been categorized. A general technology adoption life cycle model was introduced by Moore (1995) in order to describe and understand the attitudes of different consumer types. A unique psychographic profile is to be found for each of five categories: (i) innovators/techies, (ii) early adopters/visionaries, (iii) early majority/pragmatists, (iv) late majority/conservatives, and (v) laggards/sceptics. *Innovators* (for example) buy new technology products and services aggressively as they have technology as a central interest in their lives; they are the *techies* who want to try new technology as soon as it is launched on the market. Aarnio et al. (2002) used k-mean clustering to form groups of mobile users within a population of 1553 young (9-34 years) Internet users. The clustering was done based on (i) channels used for mobile services, (ii) used mobile services and (iii) used Internet services. At the time of the study, mobile services were in use mainly among pioneers and early adopters, but large-scale adoption had not yet occurred. Gilbert and Kendall (2003) built an outline of early adopter categories, identifying five requirements-based styles of adoption, ranging from mobile *professionals* to *socialites*. They could also identify two categories that were unwilling to adopt m-services: *misers* and *laggards*. Anckar and D’Incau (2003) found differences between genders and age groups in terms of interest to use different mobile services, e.g. a higher willingness among females to reserve cinema/theatre tickets via mobile phones, and a higher willingness among males to do stock trading and remote control of home appliances. Anckar and D’Incau offer interesting results on consumer interest in different mobile services, according to the type of value they offer - *time-critical*, *spontaneous*, *entertainment*, *efficiency* or *mobile need*. Wilska (2003) has conducted research especially on young users’ mobile phone use. She found that young people’s relationship to their mobile devices could be described as *addictive*, *trendy* or *impulsive*. She studied mobile phone use in connection with some general consumption styles among young people. Pagani (2004) discusses usage of mobile services in the light of the traditional user segmentation used in diffusion theory, where users are categorized according to their propensity to use new technologies; i.e. *innovators*, *early adopters*, *early majority*, *late majority* and *laggards*. Pagani also investigates the importance of variables such as *usefulness* and *ease of use* among different age groups. Hsu et al (2007) investigated intention to use multimedia message services (MMS) in light of the same diffusion theory categories. Kiljander (2004 pp.47-48) states that in order to build a high tech market a company should work the technology life cycle curve “from left to right, focusing on one customer segment at a time, growing that market, and then moving to the next segment”, and “to keep the process moving smoothly without discontinuities in the progress”. The crucial aspect is that the market is in a constant movement, and also that the psychographic profiles once identified and found accurate, are unlikely to be stable over time. The context-of-use plays a significant role (Bouwman and de Reuver, 2010) and the more specific the segmentation base and the more different the characteristics of market and consumers, the less stable the segments will be (Wind 1978). Kiljander (2004) pointed out that mobile phone manufacturers apply various socio-cultural lifestyle segmentation models, and that they share somewhat similar views on the different consumer segments. As an example, Nokia’s consumer segmentation model has changed over time from the early 1990s with four user categories (*trendsetters*, *high-fliers*, *social contact seekers* and *posers*), to the year 2000 with 2 additional user categories (*reachable* and *assured*), to the year 2002 with a subset of the previous categories (*trendsetters*, *hi-flyers*, *social contact seekers* and *assured*), to the year 2003 with six but now totally different user categories, called “Mindstyles” (*experiencers*, *impressors*, *controllers*, *maintainers*, *balancers* and *sharers*).

This type of shifting focus and changing understanding of the consumer markets may not be beneficial for Nokia's long-term success. Constantiou et al (2007) present a classification of mobile users based on longitudinal research utilizing both qualitative and quantitative tools. Their study was done in the Danish market and describes an evolutionary view on mobile users; they classify users in four categories, ranging from *talkers* who have taken a first step to learn mobile communications use, to *surfers* who have experienced three evolutionary changes in their behaviour. Constantiou et al describe their categories also through demographic variables. In some earlier work they categorized mobile users as either *basic* users or *advanced* users, and could identify differences between these groups in perceived level of innovativeness, but they showed similar profiles on the importance of different mobile service attributes. Mazzoni et al (2007) studied the characteristics of Italian mobile phone users with the help of a multidimensional segmentation method. The authors used three sets of variables; consumer/user lifestyles, use motivations and product/service attributes and identified three diverse market segments with very specific characteristics. Öistämö (2007) – a senior Nokia executive - presented another kind of segmentation with 12 user categories plotted along two dimensions, i.e. higher involvement-lower involvement and rational-aspirational. User categories that he identified in the higher involvement and aspirational dimension were *technology leaders*, *technology stylists*, *young explorers*, *life builders* and *style leaders*. In the higher involvement and rational dimension he listed *pragmatic leaders* and *life jugglers*. In the lower involvement and rational dimension there are three user categories: *mature acceptors*, *family providers* and *simplicity seekers* and in the aspirational and lower involvement dimension we find *image seekers* and *style followers*. The 12 user categories identified represented Nokia's global segmentation at that time and combined with the Kiljander (2004) results give an impression that Nokia did not have a coherent understanding of how mobile phones are used by different types of customers (or they wanted to mislead their competition by offering a confused market view). O'Doherty et al (2010) look at the use of different mobile data services with the help of demographic variables such as age, gender and form of employment. They cover such topics as e.g. different motivations to use mobile data services and factors influencing use of mobile data services, and whether different demographic variables can act as predictors of these. In their study Bouwman and de Reuver (2010) show that context-of-use influences mobile internet service adoption – the more consumers feel that mobile services add value in specific contexts, the more they are inclined to adopt these services. They found that the lifestyle of consumers moderates the importance of the dimensions of the context-of-use.

The above mentioned studies have used different methods for categorizing users on the mobile market. Our approach is a post-hoc descriptive method (Wedel and Kamakura, 2001) through which segments are identified by forming groups of consumers that are homogeneous along a set of measured characteristics which are empirically meaningful.

## METHOD

### Sample, Data Collection and Questionnaire

The empirical data were collected in 2007, 2008 and 2009, via a self-administered questionnaire that was mailed to a sample of Finnish consumers. The sample was selected from the electronic sampling frame provided by the Finnish Population Register Centre, based on a stratified sampling procedure. To select the sample we used a simple random sampling method, and the frame we used offered a complete representation of the target population, which was defined as the Finnish population between the ages of 16 and 64, whose mother tongue was either Finnish or Swedish and who resided in mainland Finland. The sample size in 2007 was 1000, in the years 2008 and 2009 we increased the size to 1300. To encourage respondents to complete and return the questionnaire, they were offered a chance to win a top-of-the-line mobile phone. The number of completed, valid responses were 497 (2007, response rate 49,7%), 538 (2008, response rate 41.4%) and 429 (2009, response rate 33 %). In the four-page questionnaire, the respondents answered questions regarding

- 1) The importance of different reasons to use mobile services
- 2) The importance of using mobile services in different situations
- 3) A set of statements describing use of mobile services and mobile phones
- 4) Current and future use of different mobile services
- 5) What mobile phone they are using and who they are (demographics)

Traditional lifestyle research was carried out through a set of statements on which respondents are asked to give their degree of agreement with each. We used sixteen statements in year 2007 and sixty statements in 2008 and 2009 in our analysis (The questionnaires used are available upon request).

## RESULTS

### Sample Profile

Here we will give the profile of our 2009 data (the 2007 and 2008 data show similar profiles). Of our respondents, 201 (46.9%) were male and 220 (51.3%) female. Approximately a third (33.3%) of the respondents was 36-50 years old, 41.3% were 51-64 years, and 25.2% were 16-35. Most of the sample, 419 respondents (97.7%) have a mobile phone. The respondents' mobile phones were predominantly relatively new; 28% up to 1 year old, 22.4% 1-2 years old. 3G-enabled mobile phones were found in the pockets of 32.6% of the respondents. An additional 4% had other high-end devices, such as Nokia Communicators or iPhones. All of 21.2% of the respondents could not recall the model of their phone; 24.4% of the respondents had GPRS-enabled phones.

### Analysis

For the analysis at hand, we conducted exploratory factor analysis on the set of statements describing the respondents' use of mobile services and mobile devices. We used Principal Component Analysis with Varimax rotation. The best solution for year 2009 turned out to be a five-factor solution, explaining about 73 % of the total variance. Variable loadings above 0.7 were seen to contribute to the factors. All included variables have communalities above 0.60. Cronbach's Alpha is above 0.7 on all five factors (see table 1).

Table 1. Consumer Categories in Year 2009 Based on Factor Analysis

Statement	Factor 1 - Skilful	Factor 2 - Efficient	Factor 3 - Trend	Factor 4 - Basic	Factor 5 - Social	h2
I have the knowledge and skills to operate mobile services	0.823					0.776
How to use mobile services is clear to me	0.810					0.736
Learning to deal with mobile services seems easy to me	0.870					0.840
It is easy for me to learn how to use mobile services	0.887					0.831
Mobile services seem easy to deal with to me	0.860					0.769
Information that I obtain from mobile services is information I need		0.740				0.694
With mobile services I can do my tasks anywhere, anytime		0.837				0.797
Mobile services make me more efficient		0.790				0.720
With mobile services I can coordinate tasks anytime, anywhere		0.836				0.765
I want my mobile device to be the latest model			0.863			0.794
I must have the latest model mobile device			0.867			0.776
I want to be among the first ones to try out new mobile services			0.711			0.654
It is important for me that my mobile phone is trendy			0.730			0.606
I use the mobile device only for calls				0.796		0.728
I need the mobile device only for calls and SMS				0.757		0.770
I do not take in use new technologies and devices before I find them absolutely				0.702		0.607
Without my mobile device my social life would suffer					0.845	0.738
I use my mobile phone to keep in touch with friends and family					0.785	0.649

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.875 (great), Bartlett's Test of Sphericity = 4472.816, Sig., 0.000

For the first factor, statements describing a confident attitude towards mobile services loaded highly. We named the first factor '*Skilful*'. A high score on the 'Skilful' factor reflects belief in one's abilities to use and learn how to use mobile services.

The second factor, '*Efficient*', mirrors an efficiency-centred view on mobile services. The ability to work anytime - anywhere is emphasized, as well as the utility of information obtained through mobile services. The person with high factor loadings on the 'Efficient' factor feels that mobile services make him more efficient.

Our third factor describes how important it is that the mobile device is of the latest model and trendy. A high score on this 'Trendy' factor would indicate placing a high importance on the device itself and on the impression it gives.

Fourth, we could identify a factor called 'Basic'. A high score on the 'Basic' factor would indicate a low interest in new technologies, and a usage style characterized by only using the most basic functions of the mobile phone; voice calls and SMS messages.

The fifth factor is characterized by the importance of the mobile device in keeping in touch with social contacts. For someone scoring highly on the 'Social' factor, the mobile phone's main function is to stay in touch with friends and family. Without the mobile phone the respondent's social life would suffer highly. The five factors are summarized in Table 1.

We started out by conducting an initial examination of how the highest factor scores were divided in our population. It was possible for a person to have a low or even negative score on all five factors. As we were interested in seeing the number of respondents who can be thought of as belonging to one of five categories following the factors, we chose an arbitrary cut-off level of 0.5 on the factor score, to exclude those respondents who are neutral or negative in relation to these factors. It was also possible to have a positive score above 0.5 on more than one factor; the results displayed are for the single highest scoring factor per respondent. The categories are relatively equal in size. The largest group among our population was respondents scoring their highest factor score above 0.5 on the 'Social' factor. 24.3 % of the respondents fell into this category, followed by 'Basic' users (23.1 %) and 'Skilful' users (19.1 %). 51 of the respondents did not score above 0.5 on any of the factor categories.

For subsequent analyses we utilized both the factor scores and simple summated scales based on the variables loading above 0.6 in each factor. Using factor scores carries the advantage of representing all variables loading on a factor, not only those loading highly, but interpretation is more difficult considering that all variables contribute to the loadings (Hair et al. 2005). Considering the research at hand, the consequences of using factor scores instead of summated scores or vice versa were seen as insignificant, as the correlations between the scores of the five factors and the corresponding summated scales ranged between 0.90 and 0.98.

We proceeded to analyze our data through multivariate analyses of variance (MANOVA), aiming at identifying whether the factors are in some ways associated with the respondents' gender, age, or other demographic data. The results are summarized in Table 2. Looking at the results presented in Table 2, we can describe which styles of mobile device and mobile service use are correlated with which demographic features. These correlations are described in the section below where we give a stereotypical description of each of the five consumer segments. In these descriptions we also present mobile device and service use characteristics typical for each group. The characteristics of mobile device and service use are based on significant differences between the five groups acquired through MANOVA.

Table 2. User Categories and Demographics, Year 2009

2009	Skilful	Efficient	Trendy	Basic	Social
Gender			Male	Female	Female
Age	16-35 years		16-22 years	36-64 years	16-22 years
Education	Higher ed	Higher ed		Lower ed	
Income	High	High	High	Low	
Socio-ec group	Managers, upper-level	Managers, upper-level	Managers	Pensioners	Students
<i>Marked characteristics obtained through MANOVA, p&lt;0.05</i>					
<i>Empty cells in table indicate no significant differences between different demographic groups</i>					

The *Skilful* can be described as being on the younger side, having a higher education, and a proportionately high yearly income. They are more frequently occupied as managers, executives or upper-level employees than as manual workers, lower-level employees, students or pensioners. There were no significant differences between genders regarding this factor. The *Skilful* did not need as much help and support to find all the functions on their mobile phones and were also least likely to think that learning to use mobile services takes too much time and effort.

The *Efficient* have a similar demographic profile as the *Skilful*; with the exception that there were no significant differences between age groups in regard to the *Efficient* factor. The improved efficiency of communication is especially important for the *Efficient* group, when looking at the importance of different reasons to use mobile services. Those scoring highly on the *Efficient* factor are most likely to use their mobile devices for work pur-

poses. They also felt that people around them find they should use mobile services. Interestingly, the *Efficient* were most of the opinion that they need help and support to find all the functions on their mobile phones. This could be related to the need to use mobile devices efficiently for work purposes, thus creating a need to have deep knowledge of available applications and services and the best ways to use them. The *Efficient* are, along with the *Trendy*, the groups who are self-reportedly significantly most likely to keep using mobile services in the future.

The *Trendy* factor was more prevalent among the male population. They are also more likely to be young, and be employed as managers or upper-level employees. When looking at the importance of different reasons to use mobile services, we could see that "To kill time" is significantly more important for the *Trendy* than for the other groups. As could be expected considering the name of the group, the *Trendy* had the newest mobile devices, with a significant difference compared to all other groups. They are also most interested in buying more expensive mobile phones with versatile features and they want their devices to reflect their identities. The *Trendy* are, along with the *Efficient*, most likely to use mobile services instead of traditional ones.

The *Basic* style of use was more predominant within the female population, and within the older among the respondents. It was less likely to be found within those who had the highest yearly salaries, and more likely to be found among pensioners than other socio-economic groups. Perhaps not surprisingly, the *Basic* were the group using their mobile phone significantly less frequently than the other groups. They feel it takes too much time and effort to learn how to use mobile services, and they have a higher sense than other groups that they do not need mobile services. They are least interested in customizing their mobile phones according to their own taste.

Finally, the *Social* style of use was more likely to be found among females, and in the younger age groups. There were no significant differences to be found between different levels of education or income, or between different occupational groups. The *Social*, along with the *Efficient*, see the mobile phone as their life line.

Also, the *Efficient*, *Trendy* and *Skilful* were most likely to find 3G mobile services useful and had the highest interest in mobile services matched to their usage needs. They also felt they do need mobile services significantly more than the *Social* and the *Basic*. The *Trendy* and the *Efficient* were most interested in using mobile services to relax. In general, the groups most interested in using mobile services in the future, the ones feeling their mobile gives them status, feeling that mobile services connect them with people anytime and anywhere, and with the most positive attitude towards using mobile services in general were the *Trendy* and the *Efficient*.

We proceeded to investigate whether there are differences between the five segments regarding which mobile services they are interested in using in the future. Within the scope of this paper, we focus on the current top 5 of the services in use; SMS, m-email, navigation services, search services and checking time tables. We analyzed the interest to use these services utilizing MANOVA. All reported differences are significant on the 0.00 level.

Interest to use all these services in the future was most prevalent among those scoring high on the *Skilful*, *Efficient* and *Trendy* factors. As perhaps expected, those scoring highly on the *Basic* factor were significantly less interested in using any of these services in the future than those scoring low on the *Basic* factor. The results for those scoring highly on the *Social* factor were not as clear and conclusive, but those with higher scores on the *Social* factor were more interested in using SMS and m-Email in the future than those scoring low on this factor.

### The exploratory factor analysis for the 2007 and 2008 samples

The exploratory factor analysis was carried out in the same way as for the 2009 sample. The best solution for 2007 turned out to be a four-factor solution, explaining 63,6 % of the total variance. We included variable loadings above 0.6 and all communalities above 0.5 (Table 3).

The first factor, explaining almost 33% of the total variance, resembles the factor *Trendy* in year 2009. It indicates a high importance on the device itself and on the impression it gives. The second factor, indicate a low interest in new technologies, and as in 2009 we label this factor *Basic*. The third factor describes a confident attitude towards mobile services and we see it as the same as *Skilful* in 2009. The fourth factor includes only one statement which mirrors the security aspect of using mobile phones and services and we labelled it *Security Seeker*. As a summary of this analysis we found out that three of the five factors in 2009 could also be described with our 2007 data.

Table 3. Consumer Categories in Year 2007 Based on Factor Analysis

Statement, 2007	Factor 1 - Trendy	Factor 2 - Basic	Factor 3 - Skilful	Factor 4 - -Security Seeker	h2
I want my mobile device to be the latest model	0.780				0.656
I prefer to buy a more expensive mobile device with versatile features instead of a cheaper basic mobile phone	0.665				0.571
I want to be among the first ones to try out new mobile	0.792				0.710

services					
I am among the first ones to employ new technologies and devices	0.686				0.632
I use the mobile device only for calls		0.740			0.556
I do not need mobile services		0.716			0.751
I do not employ new technologies and devices before I find them absolutely necessary for my private life or work		0.668			0.554
I have a clear understanding about what services can be used with my mobile device			0.801		0.531
I use, when possible, mobile services instead of traditional ones			0.801		0.735
It is important for me to have an antivirus program readily installed in my mobile device				0.868	0.771

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .809 (great), Barlett’s Test of Sphericity = 1170.627 Sig., 0.000

Looking into how the highest scores were divided in our 2007 population we find that the categories are rather equal in size. The largest group among our population was respondents scoring their highest factor score above 0.5 on the ‘Security seeker’ factor. 28 % of the respondents fell into this category, followed by ‘Basic’ (24.5 %), ‘Trendy’ (24.1 %) and ‘Skilful’ users (23.4%). 122 of the respondents did not score above 0.5 on any of the factor categories (total n=497, valid n=286).

The corresponding MANOVA results for year 2007 are summarized in Table 4.

Table 4. User Categories and Demographics, Year 2007

2007	Trendy	Basic	Skilful	Security seeker
Gender	Male			
Age	16-22 years	51-64 years		36-64 years
Education		Lower ed		
Income				
Socio-ec group	Managers	Pensioners		
<i>Marked characteristics obtained through MANOVA, p&lt;0.05</i>				
<i>Empty cells in table indicate no significant differences between different demographic groups</i>				

Again for 2008 the best solution turned out to be a four-factor solution. In contrast to year 2007 we now have the same attitude statements as in year 2009, which could/should have resulted in a five-factor solution. However we see some differences and similarities in the results of the exploratory factor analysis we conducted. As in 2009 ‘Skilful’ is the first factor explaining most of the variance. It reflects the belief in one’s abilities to use and learn how to use mobile services. The second factor, which we labelled ‘Goes with the Crowd’, was found to be different from what we found in both the 2007 and 2009 data. ‘Goes with the Crowd’ mirrors a strong belief in other peoples’ opinions about the use of mobile services. The third factor called ‘Trendy’ describes - as in the 2009 analysis - how important it is that the mobile phone is top of the line, reflecting that the user is in tune with prevailing trends. The fourth factor is ‘Social’ that also was found in the 2009 analysis. This factor describes the need to stay in touch with friends and family. As a summary we can state that three of the five factors found in 2009 could also be described with our 2008 data.

Table 4. Consumer Categories in Year 2008 Based on Factor Analysis

Statement, 2008	Factor 1 - Skilful	Factor 2- Goes with the Crowd	Factor 3- Trendy	Factor 4 - Social	h2
Learning to deal with mobile services seems easy to me	0.876				0.810
It is easy for me to learn how to use mobile services	0.876				0.804
How to interact with mobile services is clear to me	0.850				0.783
Mobile services seem easy to deal with to me	0.846				0.747
It is no problem for me to operate mobile service	0.838				0.775
I have the knowledge and skills to operate mobile services	0.837				0.781
It is easy to me to let mobile services to do what I want	0.814				0.720
Mobile services are easy to use	0.770				0.644
I can handle mobile services without the help from others	0.764				0.612

I have a clear understanding about what services can be used with my mobile device	0.661				0.453
People around me think it is a good idea for me to use mobile services		0.665			0.552
People around me find I should use mobile services		0.660			0.464
I think others should use mobile services as well		0.654			0.638
People around me have stimulated me in using mobile services		0.636			0.468
If you are to believe the media, using mobile services is a must		0.622			0.390
If you are to believe all commercial expressions, you are corny if you are not using mobile services		0.610			0.394
I prefer to buy a more expensive mobile device with versatile features instead of a cheaper basic mobile phone			0.710		0.586
I am interested in the possibility to use the Internet with a mobile device			0.668		0.583
I want to be among the first ones to try out new mobile services			0.667		0.582
I want my mobile device to be the latest model			0.624		0.445
I am among the first ones to take in use new technologies and devices			0.620		0.502
My mobile is for my social contacts				0.724	0.545
With my mobile device I feel secure				0.717	0.559
Without my mobile device my social life would suffer				0.701	0.571
I see my mobile as my emergency line				0.638	0.468
I use my mobile phone to keep in touch with friends and family				0.620	0.407

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.928 (superb), Barlett's Test of Sphericity = 13499.401 Sig., 0.000

Looking into how the highest scores were divided in our 2008 population we find that the categories are rather equal in size. The largest group among our population was respondents scoring their highest factor score above 0.5 on the 'Goes with the crowd' factor. 27.8 % of the respondents fell into this category, followed by 'Social' (25.1 %), 'Trendy' (24.4 %) and 'Skilful' users (22.7%). 117 of the respondents did not score above 0.5 on any of the factor categories (total n=538, valid n=413). The corresponding MANOVA results for year 2008 are summarized in Table 5

Table 5. User Categories and Demographics, Year 2008

2008	Skilful	Goes with crowd	Trendy	Social
Gender			Male	Female
Age	16-35 years	36-64 years	23-50 years	
Education	Higher ed		Higher ed	
Income	High		High	Low
Socio-ec group	Students, managers		Managers	
<i>Marked characteristics obtained through MANOVA, p&lt;0.05</i>				
<i>Empty cells in table indicate no significant differences between different demographic groups</i>				

Based on the three years of exploratory analysis we found that (observing that the attitude statements for year 2007 were only a subset of the statements used in 2008 and 2009) there are similarities and differences. The major insight is that (i) there appears to be shifts in how consumers perceive mobile services, and (ii) these shifts may be hard to predict, even if they appear not to be very fast.

Table 6. Exploratory Factor Analysis Results

Year	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
2007	Trendy (24.1%)	Basic (24.5%)	Skilful (23.4%)	Security Seeker (28%)	-
2008	Skilful (22.7%)	Goes with the Crowd (27.8%)	Trendy (24.4%)	Social (25.1%)	-
2009	Skilful (19.2%)	Efficient (16%)	Trendy (17.4%)	Basic (23.1%)	Social (24.3%)

Another insight, which may be minor, is that mobile network operators appear not to be familiar with the shifting mobile user preferences as there has not been any systematic use of segmentation in the marketing of mobile services in Finland. In Table 6 above we have summarized the factors we found for the years 2007-2009.

## DISCUSSION AND CONCLUSIONS

We have carried out a series of analyses to identify segments of mobile phone and service users based on data collected with large-scale consumer surveys with random samples representing the Finnish population in the years 2007-2009. We see this as a strength of our research, as we have gained knowledge not only on early adopters, or young consumers, but on the whole working-age population. Extending the sample to include also citizens above the age of 64 will in the future allow us to gain an even more comprehensive understanding of the Finnish citizens' use of mobile services, as the elderly population is a growing force to be counted with in the future also when investigating technology usage and consumption.

Contrasting our results to previous research, we can see some important differences. Anckar and D'Incau (2002), and O'Doherty et al (2010) present some differences between e.g. gender and age groups in regard to usage of mobile services. We combine this sort of demographic segmenting with attitudes and feelings describing a certain lifestyle to form a more comprehensive picture of mobile service users.

Researchers such as Pagani (2004) and Hsu et al (2007) have studied the use of mobile services in light of diffusion theory, where consumers are categorized according to their eagerness to use new technologies. This is a different view point on the same thing, which might in the future be combined with the kind of lifestyle segmenting we aim to make. It will be interesting in future research to find out if and how the user adopter categories (McCarthy 1977) relate to our five segments.

Aarnio et al (2002) and Wilska (2003) present interesting work focusing on young users of mobile technologies. We have at present not done a thorough comparison of the groups identified by these researchers among young consumers and our segments of mobile service users. Our measurement scales are not the same, and we tried to build a comprehensive picture of the segments; Wilska's focus was on comparing young people's relationships to their mobile phones with their general consumption styles. We can see that Wilska's trendy category of young users bears some resemblance to our Trendy segment. Wilska found this style of usage more common among boys; our Trendy segment is more prevalent among males. We referred to several segmentation models apparently used by Nokia in section 2; the categories used appear to be - by contrast with our results - way off the mark from the prevailing market trends; or maybe they were not intended for the Finnish market even if about 85% of the Finnish consumers use Nokia mobile phones.

Constantiou et al (2006, 2007) present an evolutionary classification, where each category of users has taken one, two, three or four steps towards becoming more advanced users of mobile services. Their approach differs from ours in that our classification of users does not describe an evolutionary process, or we are at least not aware of such a process at present.

Based on the first analysis of and results from the 2007-2009 dataset we believe that we can find some useful information about the transformation of mobile service users from one category to another. The next step of our research will be a further analysis of the 2007 and 2008 data in order to trace and explain some evolutionary patterns between the identified consumer segments. The next empirical study which we will conduct in September 2010 will give us an additional year to work with and will help us to find out if the pattern changes continue - or maybe stabilize.

## REFERENCES

- Aarnio, A., Enkenberg, A., Heikkilä, J. and Hirvelä, S. 2002. "Adoption and Use of Mobile Services: Empirical Evidence from a Finnish Survey." Proceedings of 35th Hawaii International Conference on System Sciences (HICSS'02), Big Island, Hawaii.
- Anckar, B., and D'Incau, D. 2002. "Value Creation in Mobile Commerce: Findings from a Consumer Survey", *The Journal of Information Technology Theory and Application*, (4:1) pp 43-64.
- Bouwman, H., Carlsson, C., Walden, P. and Molina-Castillo, F. J. 2008. "Reconsidering the Actual and Future Use of Mobile Services." *Information Systems and E-Business Management*, Springer Berlin / Heidelberg, ISSN1617-9846 (Print) 1617-9854 (Online)
- Bouwman, H., Carlsson, C., Molina-Castillo, F.J., Giaglis, G., and Walden, P. 2010. "Comparing the Implication of Regulation and Market Conditions for Actual and Future Use of Advanced Mobile Data Services. Comparing the Dutch, Finnish and Greek Markets." *International Journal of Mobile Communications*, to appear 2010.
- Bouwman, H. and De Reuver, M. 2010. "Explaining Mobile Internet Services Adoption by Context-of-use and Lifestyle." ICMB, June 11-13, Athens, Greece.
- Carlsson, C., Hyvönen, K., Repo, P., and Walden, P. 2005, "Adoption of Mobile Services Across Different Technologies", 18th Bled eConference, June 6-8, Bled, Slovenia.

- Carlsson C., Hyvönen K., Repo, P., and Walden, P. 2005. "Asynchronous Adoption Patterns of Mobile Services," in Sprague R. H. (ed.), Proceedings of the Thirty-Eight Annual Hawaii International Conference on System Sciences, IEEE Computer Society Press, Los Alamitos.
- Constantiou, I.D., Damsgaard, J. and Knutsen, L. 2006. "Exploring Perceptions and Use of Mobile Services: User Differences in an Advancing Market." *International Journal of Mobile Communications* (4:3) pp. 231-247.
- Constantiou, I.D., Damsgaard, J. and Knutsen, L. 2007. "The Four Incremental Steps Toward Advanced Mobile Service Adoption." *Communications of the ACM*, (50:6), pp. 51-55.
- Dubois, B., Czellar, S., and Laurent, G. 2005. "Consumer Segments Based on Attitudes Toward Luxury: Empirical Evidence from Twenty Countries." *Marketing Letters* (16:2), pp 115-128.
- Frank, R.E., Massy, W.F., and Wind, Y. 1972. *Market Segmentation*. Englewood Cliffs, N.J., Prentice Hall.
- O'Doherty, K., Hill, S.R., Mackay, M.M. and McPherson, J. 2010. "Mobile Data Service Usage and Preference: an Investigation of Australian Consumers." *International Journal of Mobile Communications*, (8:1), pp 106-127.
- Finnish Communications Regulatory Authority, 2008. "Matkapuheluhinnat 2008 - Kansainvälinen vertailu. Mobile Phone Call Prices 2008 - An International Comparison." Report 5/2008.
- Freeman, J., and Lessiter, J. 2003. "Using Attitude Based Segmentation to Better Understand Viewers' Usability Issues with Digital and Interactive TV." Retrieved 5 May, 2010, from <http://www.itc.org.uk>
- Gilbert, A.L., and Kendall, J.D. 2003. "A Marketing Model for Mobile Wireless Services." in Sprague R. H. (ed.), Proceedings of the Thirty-Sixth Annual Hawaii International Conference on System Sciences, IEEE Computer Society Press, Los Alamitos.
- Hair, J.F., Black, B., Babin, B., Anderson, R.E., and Tatham, R.L. 2006. *Multivariate Data Analysis*. Prentice Hall, 6th Edition.
- Hsu, C., Lu, H., and Hsu, H. 2007. "Adoption of the Mobile Internet: An Empirical Study of Multimedia Message Service (MMS)." *Omega* (35:6), December, pp 715-726.
- Kiljander, H. 2004. "Evolution and Usability of Mobile Phone Interaction Styles." Helsinki University of Technology, Publications in Telecommunications Software and Multimedia, Espoo, TML-A8.
- Kotler, P. 1991. *Marketing Management: Analysis, Planning, Implementation & Control*. Englewood Cliffs, New Jersey, Prentice Hall Inc.
- Mazzoni, C., Castaldi, L., and Addeo, F. 2007. "Consumer Behavior in the Italian Mobile Telecommunication Market." *Telecommunications Policy* (31), pp 632-647.
- Moore, G.A. 1995. *Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers*. New York, New York, USA, HarperCollins Publishers.
- McCarthy, E.J. 1977. *Basic Marketing Learning Aid*, Irwin, Homewood, IL.
- Nokia, 2002. "Structured for Growth. Year End Strategy Update." Retrieved 5 July 2004, from [http://media.corporate-ir.net/media\\_files/NYS/NOK/presentations/jorma.pdf](http://media.corporate-ir.net/media_files/NYS/NOK/presentations/jorma.pdf)
- Nokia, 2003. "Mindstyles Paljastaa Kuluttajien Asenteet." *Nokia People* (62), pp 20-23.
- Orth, U.R., McDaniel M., Shellhammer T., and Lopetcharat, K. 2004. "Promoting Brand Benefits: The Role of Consumer Psychographics and Lifestyle." *Journal of Consumer Marketing* (21: 2), pp 97-108.
- Pagani, M. 2004. "Determinants of Adoption of Third Generation Mobile Multimedia Services." *Journal of Interactive Marketing* (18: 3), pp 46-59.
- Sell, A., Walden, P., and Carlsson, C. 2010. "Are you Efficient, Trendy or Skilful? An Exploratory Segmentation of Mobile Service Users", 9<sup>th</sup> International Conference on Mobile Business and 9<sup>th</sup> Global Mobility Roundtable (ICMB&GMR), 13-15 June 2010, Athens, Greece.
- Wedel, M., and Kamakura, W. 2000. *Market Segmentation: Conceptual and Methodological Foundations*. Norwell, Massachusetts, Kluwer Academic Publisher.
- Wilska, T. 2003. "Mobile Phone Use as Part of Young People's Consumption Styles." *Journal of Consumer Policy* (26), pp 441-463.
- Wind, Y. 1978. "Issues and Advances in Segmentation Research." *Journal of Marketing Research* (15:3), pp 317-337.
- Vander Wal, T. 2007. "Folksonomy Coinage and Definition." Retrieved 14 April, 2008, from <http://vanderwal.net/folksonomy.html>
- Öistämö, K. 2007. "The Device of the Future." Presentation slides from Nokia World, 4 December 2007.

## COPYRIGHT

[Anna Sell, Pirkko Walden, Christer Carlsson] © 2010. The authors assign to ACIS and educational and non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The authors also grant a non-exclusive licence to ACIS to publish this document in full in the Conference Papers and Proceedings. Those documents may be published on the World Wide Web, CD-ROM, in printed form, and on mirror sites on the World Wide Web. Any other usage is prohibited without the express permission of the authors.