The mobile phone is a multipurpose device. In addition to transmitting voice communication it can provide a number of other functions and services. A good example of the differentiation from voice services is the Short text Messages Service (SMS). Other examples of more advanced use include mobile banking, taking and sharing pictures and videos, and using the Internet. This transformation process is similar to the evolution of computers: what originally was a number-crunching machine is now a multimedia information and communication device.

During the last decade we have experienced the proclaimed failure of Wireless Application Protocol (WAP), consecutive revisions of third-generation (3G) mobile technology’s diffusion forecasts, and a slow actual 3G uptake in Western markets. Consequently, both academics and practitioners emphasize that technological advances and service availability do not automatically lead to widespread adoption and use [1, 3, 4]. Besides, in the roadmaps of future research on mobile market there are repeated calls for investigating factors that predict or explain adoption, acceptance, and use of mobile services [2, 7, 9]. Interestingly, the geographic areas in which these calls have mainly originated are Europe and the U.S., suggesting these foci are of particular significance in markets that have not
The Four Incremental Steps Toward ADVANCED MOBILE SERVICE ADOPTION

Exploring mobile device user adoption patterns and market segmentation.

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kept pace with mobile service revolutions occurring in other national settings such as Japan and South Korea.

Vis-a-vis traditional diffusion curve research, which operates under the stringent assumptions of an invariant unit of innovation and a definable population of potential adopters [8, 10], the mobile services market presents different scenarios [5]. Multiple mobile services with different scaling properties can be diffused as a result of the deployment of several devices and other services, thus yielding a smaller learning effect. Diffusion of innovation theory seeks to explain and predict the rate of adoption in a user population. Factors that have been found to influence adoption rate include: adopter characteristics, social networks, communication process, promoters’ strategies, and innovation attributes such as triability, relative advantage, compatibility, observability, and complexity [8]. Additionally, this theory is based on the assumption that an innovation is superior to old products/services and thus it will eventually replace them (similar to the transition from the use of horses to tractors in farming). Mobile services are different. Adoption of a new mobile service does not automatically lead to abandonment of the previous one. Instead, new mobile services are expected to exist alongside existing ones due to complementarities. Furthermore, many mobile services are not valuable if used in isolation due to network effects [6] (for example, SMS is a service that only has value if others use it too, otherwise it represents value to the first adopters). However, for most innovations, adopters can be classified into distinct categories that relate to demographics. This enables technology providers to focus development and marketing efforts on particular segments. In this article, we utilize a reverse approach, and use espoused behavior to identify groups that are distinct, yet in the same dimension. We suggest it is critically core characteristics among different adopter types in terms of their degree of innovativeness, but also to determine user categories based on their behavior and how different perspectives to technology use evolve with varying in their requirements and attitudes. We take a learning perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes. We learn a perspective based on the assumptions that; technology and service use is not completely random, but subject to the current development of service use yield variations in their requirements and attitudes.

**Categories of Mobile Users**

In most European countries, a mobile user must subscribe to GPRS network services in order to utilize Multimedia Message Service (MMS) or new mobile services (such as those offered through multimedia or 3G services). This trend results from an overall division into GPRS and non-GPRS subscribers. These two groups can be further distinguished in terms of mobile communications service use. The non-GPRS subscribers can be subdivided into those using only voice services and those using SMS in addition to voice services. For the GPRS-enabled subscribers, a similar distinction is made between one group that uses only MMS but no other data-based services and another group using such services in addition to MMS. Both of the latter groups also use voice and SMS. Accordingly, four categories are delineated (see Figure 1).

Under the categorization scheme shown in Figure 1, “talkers” have taken one primary learning to mobile communications use, “writers,” “photographers,” and “surfers” have experienced one, two, and three incremental transformations in their behavior respectively. Mobile users adopt mobile services at different times and a migration evolution takes place.

**Mobile User’s Profile and Service Use**

The demographics of the four categories are presented in Table 1. Talkers are mainly middle-aged men with at least a high school education, working in the private sector; writers and photographers are mainly students; and surfers are mainly men in their early thirties working in the private sector. The proposed categorization is based on the use of mobile communications services and we investigate the “behavior according to the survey data. There is a significant difference in daily use of voice services between the groups: for talkers and writers it is less than five minutes, whereas for photographers and surfers it ranges from 5 and 10 minutes. Writers and surfers send less than 20 SMS, while photographers send more than 20 SMS weekly. In addition, photographers have a broader and more international, while the majority of surfers use it less than five times weekly. It seems that SMS remains a prominent communication means and MMS has not taken over yet. Moreover, proposed categorization is supported by the significant differences among groups on self-assessment of innovativeness, perceived usefulness, and intention to use mobile services (see Figure 2).

The most important benefited from mobile communications for all groups is improvement of personal relationships with peers. If we combine this observation with findings on relatively low voice service and rather high SMS use, it appears the mobile device is perceived as a contact-enabling tool that allows connectivity and communications anywhere and anytime. This is also supported by a prominent important benefit, which is “services make me accessible anywhere and anytime.” Furthermore, the mobile device is also more important for talkers and writers is less than 10 euros whereas for photographers and surfers it changes is between 15 and 30 euros, while the main reason for choosing a mobile operator is low price.

**Mobile User’s Device Requirements**

Experience with mobile devices may affect adoption and use of specific services. There is significant difference in experiences of mobile users in Denmark between talkers and surfers have more than six years, whereas writers and photographers have less than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students). With regard to mobile device characteristics, writers and photographers have more than six years of experience. This result may relate to the observation that the latter groups mainly include younger people (such as students).
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In this article, we utilize a reverse approach, and use espoused behavior to identify groups that are distinct, yet in the same dimension. We suggest it is critical to recognize characteristics among different adopter types in terms of their degree of innovativeness, but also to determine user categories based on their behavior and how differently they perceive mobile service use variability, for the adoption of mobile services. Categories of Mobile Users

In most European countries, a mobile user must subscribe to GPRS network services in order to utilize Multimedia Message Service (MMS) or new mobile services (such as those offered through multimedia phones). This article results from a survey conducted in the Danish mobile communications market.1 Demark is among the most advanced European countries in mobile communications (Denmark maintains the top ranking of e-readiness, a measure developed by the Economist Intelligence Unit) and represents a very competitive market (for example, nine mobile operators resulting in extensive price wars on contracts for SMS and voice services). Thus, we believe this is a useful example of a country in which we can investigate emerging trends in mobile services and usage patterns that may be prominent and repeated in other Western markets.

We conducted statistical analysis to identify: mobile user categories; key characteristics in technology and service use that differentiate the categories; and differences among the categories in terms of end-user requirements. We propose a categorization of mobile users exploring congruities and differences in demographics, technology and service use, and technology-service requirements. This is expected to reduce the problems of the individual-blame bias [8] as it opens for categorizing users based on behavioral-requirements differences and not only on their predispositions whether to adopt.

Our study contributes to academic and practical research on mobile services adoption and use on two separate accounts. The survey data can be utilized to support segmentation and targeting of mobile communications services. For the GPRS-based SMS, a measure developed by the Economist Intelligence Unit (Denmark maintains the top ranking of e-readiness and innovation is superior to old products/services and this theory is based on the assumption that an innovation means developed by the Economist Intelligence Unit) and represents a very competitive market (for example, nine mobile operators resulting in extensive price wars on contracts for SMS and voice services). Thus, we believe this is a useful example of a country in which we can investigate emerging trends in mobile services and usage patterns that may be prominent and repeated in other Western markets.

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Under the categorization scheme shown in Figure 1, “talkers” have taken one primary learning (and adoption) approach to mobile communications use, “writers,” “photographers,” and “surfers” have experienced one, two, or three major transformations in their behavior respectively. Mobile users adapt to new ones as the time and migration evolution takes place in stages.

Mobile User’s Profile and Service Use

The demographics of the four categories are presented in Table 1. Table 1. Demographics of mobile users

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Mobile User’s Device Requirements

Experience with mobile devices may affect adoption and use of specific services. There is significant difference in years of experience between mobile users since talkers and surfers have more than six years, whereas writers and photographers have less than six years of experience. This result may relate to the observation that the latter two groups mainly include younger people (such as students). With regard to technical experience, writers and photographers have more than six years of experience, whereas the other two groups less than one year.

Technology-service features of mobile devices

The survey instrument included 43 questions organized in different categories including adopter characteristics, social networks, communication process, promoters’ strategies, and innovation attributes such as triability, relative advantage, compatibility, observability, and complexity [8]. Additionally, this theory is based on the assumption that an innovation is superior to old products/services and this theory is based on the assumption that an innovation means developed by the Economist Intelligence Unit (Denmark maintains the top ranking of e-readiness, a measure developed by the Economist Intelligence Unit) and represents a very competitive market (for example, nine mobile operators resulting in extensive price wars on contracts for SMS and voice services). Thus, we believe this is a useful example of a country in which we can investigate emerging trends in mobile services and usage patterns that may be prominent and repeated in other Western markets.

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Among my peers, I am usually the first to try out new technologies and services. These indications highlight the difference between the two groups that also relates to their decision whether to activate their GPRS accounts. This may explain the difficulties experienced by SMSG operators trying to convert talkers and writers to surfers since the gap is difficult to be bridged with one step alone. Thus, we propose the key players in the mobile market should develop different marketing strategies focusing on photographers needs that are one step behind adoption of advanced mobile services and at the same time promoting a slower migration path for writers that seem satisfied with the use of commodity services such as voice and SMS.

The two most advanced categories, photographers and surfers, significantly differ in technology and service use. Surfers prefer the highest mobile device, that is, a color display but the second one for surfers is email, while for photographers PC synchronization is most important. Moreover, the members of the most advanced categories have significantly different perception of key attributes of mobile services. Photographers attach higher importance to ease of use, security, customer service, personalization, and comfort of the device than surfers, but they both consider services pricing the most important attribute of mobile services. These observations may explain why photographers have not yet adopted advanced mobile services.

There are strong indications that the usage trajectory of voice and SMS to also include MMS and advanced data services. However, there are significant differences among all categories of users concerning their use of mobile services in the future, as shown in Figure 1. This also underscores our initial observation that a mobile phone is not a static technology. Its usage is learning-intensive and services must be embraced by users. There appears to be a leap in functionalities in mobile devices that only mobile operators have the power to release to the users.

We argue that the thrust of utilizing the proposed categorization lies not only in identifying differences, but also opening avenues to discover areas where congruencies exist. These can form the basis for catalyzing usage paths and enabling migration of users within a category to one of more advanced use. In turn, this migration implies a departure from commodity services such as voice and SMS to more specialized services that may generate higher revenues to the key players. The proposed categorization offers insights to key players that can be used while launching new services or segmenting their market. In order for mobile operators or service providers to facilitate the trajectory movement it is useful to address the specific areas where there are congruencies in terms of technology, service use, and service requirements.

CONCLUSION

Categorization of mobile users based on technology and service use offers insights beyond those provided by aggregate diffusion models and criteria purely based on innovativeness. As adoption of mobile devices does not imply homogenous use, we have identified specific areas in which congruencies can be found or where significant differences exist (see Table 3). Due to extensive subsidies on mobile devices in the Danish market, most of the respondents have relatively new devices. In particular, talkers, the least advanced group, have mobile devices that are typically less than two years old. Thus, a talker may potentially possess the same advanced mobile services as a surfer, but has never used them. Besides, talkers have no specific technology or service requirements and seem to be stagnated in their perception of a mobile phone simply as a communication tool used anywhere and anytime. Hence, we suggest that middle-aged managers, to whom mobile operators’ marketing efforts on advanced mobile services are mainly focused, may not be the optimal target group.

Moreover, the two large categories of writers and photographers significantly differ in technology and service use as well as their requirements. Writ-
may enable or impede service use. For example, in the case of photographers the color display may vividly affect service use [3]. The users’ requirements can be broadly distinguished in terms of device features such as color display, camera, and properties such as messenger, broadband Internet, mobile email, and other attributes. The most important requirements for all groups are color display and email and the least important ones are messenger and games (see Table 2). Email has a rather high rating among all groups indicating a generally required service.

Moreover, PC synchronization is also ranked high among all groups. Better integration between the Internet, email, and PCs may be an important path toward more advanced mobile service use. Photographers and surfers do not significantly differ in most of their requirements. However, there are significant differences in enabling services such as broadband Internet access, email, and mobile devices. The result supports the argument that surfers have taken an extra behavioral change step and that once taken, it is reflected in their future requirements. The distinction between GPRS and non-GPRS subscribers is further indicated by the significant differences between writers and photographers. GPRS users on all requirements. Besides, readers and writers do not have significantly different requirements in terms of color display, camera, video, and messenger.

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