Telematics and Informatics 31 (2014) 220–227

Contents lists available at ScienceDirect

Telematics and Informatics

journal homepage: www.elsevier.com/locate/tele

Mobile customer segmentation based on smartphone measurement

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ARTICLE INFO

Article history:
Available online 2 September 2013

Keywords:
Smartphone
Mobile service
Customer segmentation
Lifestyle

ABSTRACT

While customer segmentation for mobile services is typically based on demographics and reported use, smartphone measurement software enables to add directly observed user behavior. This explorative paper develops customer segmentation on relevant metrics from the perspective of network operators, handset manufacturers, and application developers. We analyze the results of a smartphone measurement project among 129 users using latent class analysis. The data are subsequently related to demographics and psychographics, to enable lifestyles. We find that several service clusters can be defined from the perspectives of the usage of the network (i.e. voice, SMS and data) and the usage of content services (i.e. URLs and applications). We demonstrate that such clusters can be related to demographic as well as psychographic segments. The results provide fine grained insights in market segments as well as new hypotheses about mobile behavior that are open for further testing. While being exploratory in nature, the study demonstrates the relevance of customer segmentation on smartphone measurement data.

1. Introduction

Smartphones have a profound effect on lifestyles as they change the way that people live, work and learn (Ling, 2012). Smartphones come with modern design including touch screen and bigger screen size. With technological convergence, integration of voice, texting, video, gaming, mobile internet and GPS and the increasing capacity of mobile networks, smartphones are able to provide advanced functionality to their users such as seamless communication, social networking, information, multimedia entertainment, m-commerce, personal productivity tools, and much more.

However, the smartphone revolution also poses challenges to the actors in the mobile ecosystem as usage patterns are far from stable. Evolving technologies are enabling novel value-adding services, Internet players are pushing aside communication services from network operators and applications are just as easily hyped as marked outdated. As a result, network operators, application developers and handset manufacturers need to understand and respond to the dynamic change in behavior of users. An important marketing approach to do so is market segmentation, i.e. dividing the addressable market into segments that have a consistent demographic, psychographic or usage pattern.

Typically, such market segmentation is based on reported use figures as well as static demographic indicators. Operators and developers do collect actual usage numbers but typically only on their own service offerings. However, smartphones enable a novel way of data collection across any device, network and application by having a background application on the handset log the activities of users. This paper reports on an explorative study that aims to elicit customer segmentation

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http://dx.doi.org/10.1016/j.tele.2013.08.006

based on data collected through smartphone measurement software. Specifically, we will construct customer segments on observed behavior metrics that are relevant from the different perspectives of network operator, application developer and handset provider. We will subsequently relate these behavioral segmentations to demographic and psychographic segmentations, i.e. lifestyle groups.

First we will discuss segmentation literature and prior research in the mobile domain. Next, we will present our research approach and results based on latent class analysis. The paper will conclude with a discussion, limitations, implications and future research.

2. Literature review

The concept of market segmentation is introduced by Smith (1956). "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 on their varying wants (p. 6)". Smith suggests three criteria to be fulfilled in segmentation: (1) homogeneity (i.e., communality of needs within group), (2) distinction (i.e., uniqueness between groups) and (3) reaction (i.e., similarity of response towards marketing strategy, product, offer or services within group). Kotler (2003a) claims that market segmentation allows creating a more fine-tuned product or service offering and price appropriately for a target segment. He also claims that marketers can provide better distribution and communication channels to the segment.

Three major segmentation dimensions are commonly used: demographic, psychographic and behavioral (Kotler, 2003b). Demographic variables are the most popular dimensions and include age, family size, family life cycle, gender, income, occupation, education, religion, race, generation, nationality, and social class. The purpose of psychographics is to obtain a better understanding of the consumers as a person by measuring psychological dimensions, way of living, interests and opinions (Ziff, 1971). The most widely used approach to measure lifestyle is by using activities, interests, and opinions (AIO) rating statements (Plummer, 1974; Wells and Tigert, 1977). A widely-used tool for lifestyle segmentation is the VALS scheme (Rokeach, 1973) that blends research of values, hierarchy of needs and sociology in its operation. Behavioral segmentation focuses on the actual behavior of users, including occasions, benefits, user status, usage rate, loyalty status, readiness and attitude toward products.

All three segmentation techniques have been used in research on mobile acceptance and usage behavior, see Table 1 for an overview. Most researchers take behavioral segmentation as a starting point. Behavioral data can be gathered through self-reports which is done by Uronen (2008), Jansen (2007), Falaki et al. (2010b), Sohn and Kim (2008), and Aarnio et al. (2002). Lin (2007) gathered mobile usage data through call detail records collected by an operator. Hashemi (2010), Falaki et al. (2010b), Okazaki (2006), Mazzoni et al. (2007), Gilbert and Kendall (2003), and Siddiqui et al. (2009) did not use the actual usage of handset or mobile service usage but the intention to use or perceived benefits. While most papers focus on mobile services in general, some of them segment users according to the type of services they prefer.

In addition to behavioral segmentation, most studies use demographic segmentation as well. According to Walsh et al. (2010) younger users are most likely to be highly involved with their mobile phones. Plaza et al. (2011) find that elderly people apply mobile phones merely to communicate with relatives, as memory and daily life aids, as enjoyment and self-actualization, and as tools to feel safe and secure. In terms of gender, Castells et al. (2004) find that female users not only appropriate mobile phone as a fashion item but, more importantly, also as a key channel to maintain intimate personal relationships, as opposed to men who tend to use mobile phone for instrumental purposes (Castells et al., 2004).

Psychological segmentation for market researchers in our finding is not as popular as demographic and behavioral segmentation, exceptions being Hashemi (2010), Mazzoni et al. (2007), Sell et al. (2010), Siddiqui et al. (2009) and Tao (2008). Mazzoni et al. (2007) combine psychographic segmentation with demographic and behavioral segmentation and find that lifestyle groups have different motivations and product attributes. Bouwman et al. (2008) present a psychographic segmentation based on sociological factor in which how people deal with their social life, and psychological factor of the person (introvert or extrovert). Four segments are found which consist of unique needs, demands, motivations, requirement on products or services or communication. Additionally, De Reuver and Bouwman (2010) find that those four lifestyle segments moderate the effect of context-use of mobile phone towards mobile user behavior intention to use product and services.

Which behavioral variables to use for segmentation depend on the perspective of the actor. For mobile operators, Seth et al. (2008) analyze different service quality attributes and show that responsiveness is the most important dimension followed by reliability, customer perceived network quality, assurance, convenience, empathy and tangibles. Haque et al. (2007) suggest that price, service quality, product quality & availability, and promotional offer play a main role in choosing a telecommunication service provider. Moreover, Park and Lee (2011) find that mobile users prefer to have instant connectivity, wherever they are, and equal or higher data speed than fixed internet. They also added that alternative network access technology such as WiFi which now can be supported by most of current smartphones, possess treat to the usage of cellular network as consumer still prefer to access internet free of charge with data speed that equals or are higher than cellular network.

For application developers, how users make choices from the vast amount of applications depends on the type of application they use such as information, entertainment or social life. In the US, users are spending more time to use mobile applications rather than web browsing (Newark-French, 2011). Furthermore, gaming and social networking application are mostly used by consumers throughout the day.