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The Underlying Motivations for Mobile Device Use by Seniors

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Abstract: To date, there has been limited research carried out to better understand seniors' needs and purchase motivations related to mobile devices. To that end, this research enabled an exploratory assessment of the intrinsic and extrinsic needs/motives to consider in future research and development of ubiquitous mobile devices and related applications, specifically for seniors. The 65+ population is expected to double by 2025 (WHO, 2013) from 390 million to 800 million. The results demonstrate specific needs/motives which should be considered during the development of new mobile attributes and apps for this segment. For both attributes of devices themselves and the applications found on them, three tiers of priority for development were determined.

Key words: Senior consumers, intrinsic and extrinsic motivations, mobile devices, applications, device attributes.

1. Introduction

Since Apple launched its "App Store" in 2008, the revenues from mobile applications ("apps") have risen to a total of 2.155 billion USD in 2010 [1] and these were expected to grow to between 100 [2] and 185 billion US dollars [3] in 2015. This industry provides a massive infrastructure for responding to various customers' needs. Yet, surprisingly little has been done to date by the mobile industry to address the different needs of the variety of potential customer segments it serves. One specific group, which we believe that offers such an opportunity, is comprised of "senior" (65+) consumers.

The global population of seniors (65+) is predicted to increase by almost 50% by 2025 [4]. Despite the added limitations that come with the aging process [5]. more than 90% of Canadians 65+ live autonomously in their communities and wish to remain that way for as long as possible. Research in the field of gerontology shows overwhelming evidence of the various positive economic and social outcomes associated with social activity, independence and aging well. "Active aging" has its benefits [6]. Mobile devices and their related applications can also provide important support mechanisms for seniors, thereby reducing social network dependence and improving their security [7]. Seniors are also a high category of growing users of the Internet and mobile devices (nearly four times higher in 2007 than in 2000). In the U.S., alone, the smart phone penetration rate attributed to this group in 2013 was 18% [8]. Based on this growth, the senior segment is quickly becoming an important, promising market, however, it is still underrepresented in terms of focus from the industry [3]. There needs to be a focus on seniors' perceptions of mobile applications and how to educate and help the segment to learn more about how to use them. Inherently, increasing numbers of seniors will require social applications allowing them to better communicate and become active participants in our digital society [9]. As such, our research aims at uncovering the interests of seniors regarding mobile devices and the applications installed on them.

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2. Literature Review

The technology literature dealing with mobile devices clearly shows that, until now, with the exception of some health and accessibility services [10], most mobile applications, have not taken account of senior's needs during the design process. This, in turn, has resulted in many interfaces that are not suitable for seniors, and a bias toward younger users and state-of-the-art features [11]. Similarly, there are many researches focused on technology aspects such as sensor design, monitoring techniques, machine learning algorithms, reasoning approaches. The fundamental issues of activity context and information representation have not received enough attention related to seniors' needs [7].

Recent research has applied the theory of "Uses and Gratifications" (U&G) to understand individuals' motives for using new technologies [12]. U&G theory is based on the assumption that individuals choose a specific technology to satisfy their needs and wants in combination with social, psychological and media factors. Other scholars have specifically focused on using a QOL (quality of life) approach [13, 14] to examine how new technologies affect seniors' QOL. Other researchers use the framework developed for the TAM (technology acceptance model) (e.g., [15, 16]) and its extensions (e.g., [17]) and have applied it to the context of the adoption of mobile phones, but not with seniors. Another stream of research, stemming from marketing & innovation theory, has examined other factors that affect the diffusion process such as the attributes of innovation (beginning with Rogers, [18]), word-of-mouth [19] activities and economic considerations [20]. Other studies, yet, look at usability problems such as those related to the shape or design of the devices or complexity of the interfaces [17].

All-in-all, limited work has been carried out related to the specific perceptions and attitudes held by seniors related to mobile attributes and applications of the devices currently on the market. Given this, our interest was to create a framework for this research, building on the retailing literature, which studies the motivations and interests driving consumer shopping behaviors. This literature suggests that consumers shop for reasons going beyond provisioning needs [21]. These take the level of understanding a further step from the U&G, QOL, TAM and diffusion studies. As such, we examined the shopping typologies developed in the retailing literature to synthesize motivational differences by consumer type focused on social motivations, economic factors or shopper orientation based on primary interests [22-27]. In more recent years, these have been considered using a framework that divides these factors into two: extrinsic (i.e., functional needs as a means to an end) and intrinsic factors (i.e., non-functional needs) [28]. Consumers with intrinsic motives are seeking to derive richer, fuller experiences from activity.

Moreover, Ref. [29] used the following typology in recent research specific to senior shoppers: the "functionalist" has specific shopping objectives and wants to get in and out of the store as quickly as possible; the "social shopper' is primarily motivated by socializing during shopping; and the "experiential shopper" who is primarily motivated by how they feel during their experience with promotions, products and the store's environment. This study revealed that both social and functional shoppers show lower adoption of such mobile devices than their experiential counterparts. However, adoption of such devices and related apps might be encouraged through service simplification, lowering of price and education/training [29].

The selection process for acquiring mobile applications and attributes can be assumed to be similar to the shopping motives that emerge in a regular shopping experience. As with retailing, some consumers will be looking to fulfil their extrinsic needs and/or their intrinsic needs depending on their mobile device adoption profile. Yet, to be useful, mobile technologies must, from the start, be designed according to the characteristics of seniors (i.e. tailored to their cognitive and physical abilities) so as to address such needs and promote "willingness-to-adopt" and

use them. As such, this study contributes to the literature by identifying the interests of seniors in terms of the applications and attributes of mobile devices by utilizing an intrinsic/extrinsic motivation framework.

3. Propositions

To uncover the attitudes of senior people towards mobile apps, we formulated 3 propositions:

(P_{1a-b}): Seniors experience different motives, (a) functional (e.g., price info, meal planning, reminders) and (b) non-functional (e.g., social, experience) influencing their interest levels in mobile applications. Motives can be extrinsic (i.e., functional needs as a means to an end) or intrinsic (i.e., non-functional needs) [28]. Hence, P_{1a-b} aims to investigate whether and how different motives influence the use of mobile applications by seniors.

(P_{2a-b-c}): Seniors experience different motives, (a) functional (e.g., screen size), (b) non-functional (e.g., easy to use, easy to understand) and (c) value added (e.g. warranty, services), which influence their interest levels in mobile attributes. As noted by [30], perceived "ease of use" impacts seniors' attitudes towards mobile devices. Ease of use is considered to be largely experiential in nature and therefore "non-functional". Others studies have demonstrated that "perceived value" affects seniors' purchase behaviour intention for mobile health services [31].

(P_3): There are differences, based on autonomy level, within the senior segment in relation to their interest in mobile apps and attributes. One typology [29] showed that demographic and health profiles mitigate senior's behaviour. Income, dexterity capabilities and general health showed a distinction between adoption and non-adoption of mobile devices [29]. It is therefore also likely that autonomy, measured by possession of a driver's license, would be related to mobile adoption.

4. Research Method

The survey was pre-tested with 9 and final-tested with 103 participants (65 to 95). The questions (Likert-scaled 1-7) pertained to 33 applications (e.g. bus schedule, weather forecast, to-do lists etc.) and questions on 34 attribute characteristics (e.g. good quality, perceived value, easy to use, easy to buy, number of keystrokes to perform an activity, etc.).

5. Results

5.1 Proposition 1

(P_{1a-b}): As proposed, we found early support for the proposition that the use of mobile applications is driven by 3 motives: social, experiential (both non-functional) and functional. The first application category related to apps currently being used by seniors, regroups "Social" motive/apps (average mean = 5.24) and is part of non-functional motives. It includes applications such as contact list, social planner to stay in touch with family and friends and phone calls as a means to socialize with people. Secondly, seniors are using experiential applications that enable them to "stay informed and amused" (average mean = 3.75) in their environment. These applications are driven by the motive of staying on top of the news, reminders for activities, weather forecast, daily routine planner and having social function suggestions and access to music. This second category is also part of non-functional motives. The third category corresponds to functional or "practical" motive/type of applications (average mean = 2.94). These include apps to create to-do lists, meal planners and price info. ANOVA analysis was used to validate whether these motives are statistically distinct. Results confirm social motive is statistically different from the experiential motive (P-val = 0.046 < α) as well as from the functional motive (P-val = 0.002 < α). However, the experiential motive is not significantly different from the functional motive (P-val = 1.000 > α). Further, the tabulation of the apps seniors is interested in using but do not currently use similarly revealed three main motivations. These include social motives (average mean = 4.30), experiential motives (average mean = 3.12) and functional motives (average mean = 2.38). The

ANOVA results reveal the social motive is statistically different from the experiential motive (*P*-val = 0.044 < α) and from the functional motive (*P*-val = 0.001 < α). Though, the experiential motive did not produce a significant result to confirm its mean is different from the functional motive (*P*-val = 0.415 > α).

5.2 Proposition 2

($P_{2a\text{-}b\text{-}c}$): The second proposition seeks to uncover whether seniors have different motives that influence their interest levels when it comes to mobile phone attributes. The same procedure was used as with proposition 1. The frequency tabulation exercise generated three underlying motives. These encompass the "ease of use" motive (average mean = 6.58), a "value" motive (average mean = 6.11) and a functional motive (average mean = 5.70). Phone attributes results showed that the primary requirements that seniors are looking for are an experience that pertains to "easy" whether it relates to being easy to use, easy to understand, ability to start quickly, easy user guide or long battery life. The secondary phone attributes requirements were related to "value" whether they are perceived value (benefits to costs), warranty, and access to Internet or low price for services. The tertiary requirements related to "functions" like lightweight, bright screen, not many keystrokes to perform action, large screen, large keys and solid keys. Functions required less by seniors include the following: customizable design, aesthetic design, nice colour casing, voice capabilities and physician support. The ANOVA results showed that all three motives/needs categories are distinctively different from one another. The "ease of use" motive was significantly different from the "value" motive (*P*-val = 0.012 < α) as well as from the "functional" motive (p-val = 0.000 < α). The "value" motive was statistically different than the "functional" motive (*P*-val = 0.059 < α) at 90% confidence.

5.3 Proposition 3

(P_3): There are differences within the senior segment in relation to their interest in mobile apps and attributes. The overall interest in mobile apps is related to seniors' level of autonomy (i.e. having a driver's license).We tested this by using the Chi-square test analysis. Results show that interest in mobile devices is, in fact, dependent on the level of autonomy experienced by seniors (Pearson χ^2 = 0.047 < α). Proposition 3 is therefore supported. It was shown that seniors who have to rely on others for their transportation care are the ones who see the greatest value in using a mobile device (std. residual = 2.1). This brings even more weight to the importance of developing mobile applications that meet seniors needs and requirements (e.g., attributes), with the purpose of helping seniors through aging well and reducing their dependence on caregivers.

6. Discussion and Implications

Our results show that, in terms of mobile applications desired by the seniors market, there are three key needs/motivations which have been identified (in order of their prevalence in our sample) and which conform to the shopping typology put forward by [29] social, experiential and functional. Additionally, we show that there are three tiers of priority for development of the mobile device attributes. The most important priority, by far, was "ease of use" (e.g., easy to use, easy to understand, able to start quickly). The second priority of three identified was "value" (e.g., good quality for price, warranty, services). The third priority was a good array of "functional" features (e.g., lightweight, bright screen, low of keystrokes to perform an activity, solid feeling keys). Mobile device manufacturers might consider addressing these priorities, based on the sequence determined in this research.

7. Conclusions

Our contribution lies in adding to the scarce literature [32] focused on better understanding the underlying motivations driving growing interest in

mobile applications and attributes by seniors. There is a shared collective view regarding seniors and their ability and willingness to learn "intellectually" challenging skills such as those presented in the case of using mobile devices. These perspectives may have impacted developers and companies operating in this field. This study demonstrates that seniors' interest in mobile applications is linked to their level of autonomy. This is an important finding given that 90% of seniors, estimated to reach 800 million by 2025, live independently and want to remain in their homes [4] and ICT offers perhaps some of the largest economic and social opportunities to this segment of consumers [33].

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