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IMPACT OF EXOGENOUS PURCHASE DECISION ON MATURE PEOPLE'S MOBILE PHONE USE IN JAPAN

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Abstract

Mobile phones may be desired presents for children, but how mature and older people react when they get one from their spouses or children. This paper studies how the use of mobile phone functionalities and services are impacted if the purchase decision is exogenous, not by the end users themselves. Two surveys about mobile phone use was conducted in Japan with respondents (n=82) older than 55 years. The quantitative data was analyzed with t-tests and some of research hypothesis were rejected. This study suggests that the use frequencies of internet, mail and camera are smaller among older users, who have not bought the phone themselves, although the use frequencies of those functions are very low in the first place. However, this decision making has no influence on the frequency of making phone calls, using calendar and alarm functions nor pedometer. The study also shows that informants of this study appreciate more utilitarian than hedonic services; tangible benefits are more important than entertainment.

Keywords: mobile phone, older people, purchase decision, utilitarian and hedonic use, Japan

1 Introduction

The accelerating ageing of the world's population is a well-known fact (United Nations 2010). The speed is the highest in Japan, where the proportion of people older than 65 years is estimated to reach 35.7% in 2050 (Tsuno and Homma 2009). Additionally, the traditional family concept, *ie*, meaning that older people live with their son or daughter, is breaking down. Japan is moving towards Western nuclear family model, where older people form their own households (Ueno 2009). This will put pressure on health care and social services, but equally on technology as well as on businesses providing devices and services for the potential user group of older people. Unfortunately, most of the major mobile phone manufacturers seem to neglect this big target group as to the design of mobile phones. In Japan, however, Fujitsu launched a mobile phone for senior citizens in September 2001. This Raku-Raku Phone meaning "easily" or "easy-to-use" has been doing well; NTT Docomo has sold over 17.8 million Raku-Raku phones by summer 2010 (Fujitsu Ltd 2010).

The adoption and use of mobile phones have been studied intensively from the perspective of older people (Abascal and Civit 2001, Kurniawan 2008, Oppenauer 2009, Kubik 2009, Renaud and van Biljon 2008). In addition to some physical features of mobile phones hindering the use, such as small screens or tightly placed buttons, there are also social, psychological and situational factors impacting on the behavior to use mobile phones. For instance, anxiety towards technology (Kurniawan et al. 2006), privacy matters (Kurniawan et al. 2006) and social environment (Abascal and Civit 2001, Kurniawan et al. 2006) as well as the situation where mobile phone is used (Mallat et al. 2006) may influence the older people's use of mobile phones.

Furthermore, the functionalities of mobile phones that older people are using seem to be more limited than among younger people. Based on research literature, older users of mobile phones prefer functions increasing their autonomy and feeling of security (Abascal and Civit 2001). Another research found that the benefits of using mobile phone seem to relate to social relationships; phones are used for contacting family and friends, setting appointments and sharing news with them (Melenhorst et al. 2001), yet these use patterns can increase autonomy. Besides making phone calls in similar situations as mentioned previously, older people use their phones in emergency situations and like to use alarm clock and address book (Kurniawan 2008). According to aforementioned source, older people are interested also about sending SMS, but there are opposite views as well (Ling 2008). In Japan, Short Message Service is not used, but every mobile phone has a dedicated email address.

A common nominator for the abovementioned use patterns and perceived benefits is their utilitarian nature. The values behind motivation what kind of products or services people want to consume can be split into utilitarian and hedonic ones (Babin et al. 1994), which in mobile service context can refer to efficiency and entertainment, respectively (Anckar and D'Incau 2002). Consequently, some users of information systems are probably more utilitarian and some more hedonic by nature (Heijden van der 2004). Similar characteristics emerge also in a study segmenting mobile service users (Sell et al. 2010). The utilitarian-hedonic axis can also be recognized in studies categorizing actual mobile services (Heinonen and Pura 2006, Nikou et al. 2011).

When people have taken a mobile phone in use, they have passed an important threshold of making the decision of using it. However, there is an interesting case that has not been researched much. Are there any changes in mobile phone use patterns if the older mobile phone user has not been allowed to decide herself whether she wants a phone or not? This can be a case when children buy a phone as a gift for their older parents while parents are not necessarily committed to use the phone (Mallenius et al. 2007) and it seems that there is a correlation between the use frequency and the way how the phone is acquired (Gelderblom et al. 2010). This paper will open this topic more and compare the usages of different mobile phone functionalities between two groups of mature people: those who have acquired the phone themselves and those whose families have decided to buy a phone for their older parent.

2 Research hypothesis

The research question of this study is the following: What happens if the mobile phone user has received a mobile phone from someone else, e.g. as a gift? What if the user has not made the purchase decision but spouse or children of the user? The research question is presented in the form of research hypothesis:

H1: Mobile phone purchase decision made by someone else than the user herself does not impact her mobile phone use i.e. the use patterns are similar in spite of the purchaser.

3 Methods

Two rounds of Japanese surveys of 82 mobile phones users, 50 females, 31 males, and one non-response on gender question, were conducted in rural town of Saijo in Shikoku, in city of Sendai and in Tokyo. The age of the participants varied between 55 and 88 years. The results of a pilot survey, which was made autumn 2010 in Tokyo (11 interviewees) by interviewing passers-by, are included in this study when applicable. The second survey round was conducted autumn 2011 in Saijo (31 persons), Sendai (19 persons) and Tokyo area (21 persons) mainly by convenience sampling and snowballing.

3.1 Survey form

The survey forms were written in English and translated to Japanese by native Japanese after which the forms were discussed and corrected with another Japanese person. Based on the experiences from the first survey round some additions and changes were done in the second round forms. For instance, the forms were rewritten with font size 16 to help older people to see the questions. The survey form consisted of following parts:

- demographic questions
 - gender
 - age category
 - marital status
 - form of living (alone, with spouse, with spouse and children, with child's family or at old people's home)
 - education (e.g. elementary, vocational school, junior/senior high, college, university levels)
 - current work (retired, unemployed, full-time, part-time, housewife)
- semantic differential (21 adjective pairs)
- mobile phone information
 - how long time the informant has had a phone
 - when the informant acquired the latest phone
 - who acquired the phone: purchaser (herself, spouse, company, children)
 - operator
 - senior phone e.g. Raku-Raku (yes/no)
- phone usage (5 scale: several times a day, once a day, once a week, sometimes, never)
 - making/receiving phone calls
 - sending/receiving mails
 - playing games
 - browsing internet
 - using Social Network Services (SNS)

- listening music
- using alarm functionality
- using calendar functionality
- using pedometer for counting steps
- taking photos with the camera of mobile phone
- open questions

The phone usage section also had a choice, where the interviewee was able to answer if she was not aware about the availability or existence of service or function.

3.2 Participants

The interviewees of the first round were interviewed in Tokyo by a native Japanese person. The older people were randomly picked in the public premises of OZONE Living Design Centre. Most of the people we passers-by, some of them visited the design exhibitions. Consequently, the interviewed persons were active and independent. In contrast, the second round of interview in Saijo included also people who needed assisted living and some suffered from mild dementia. The research in Saijo, which is located in relatively rural area, consisted of interviews of patients and staff from maintenance staff to medical doctors of a private hospital and four day centers and old people's home and day centers. Interviews in Sendai followed the similar pattern; visitors and staff of a day center participated in the survey fillings. The second survey in Tokyo was a convenience sample of relatives and friends of one of the assistants who helped with the study in Japan. Some of the people filled the surveys by themselves, but the Japanese assistants and hospital staff helped older participants by interviewing and filling the survey for them. A common nominator for all interviewees included in this study is their age of 55 years or older. Table 1 lists statistics (Pearson Chi Square) on interviewee groups based on if the phone was acquired by herself (55 cases) or by external person i.e. by spouse (11 cases), children (14 cases) or company (2 cases). All the figures in the Table 1 may not add up to 82 because of non-responses.

Table 1. Interviewee demographics

		Purchaser			Chi square	df	p
		Myself (total=55)	Not myself (total=27)	Total			
Gender	Male	24	7	31	2,613	1	0,106
	Female	30	20	50			
Education	Elementary level	6	2	8	6,292	3	0,098
	High school level	30	22	52			
	Bachelor level	16	2	18			
	Master's level or PhD	3	1	4			
Location	SAIJO (rural area)	19	12	31	2,964	2	0,227
	SENDAI	11	8	19			
	TOKYO	25	7	32			
Housing	Alone	9	4	13	0,292	2	0,864
	With family	45	22	67			
	Old people's home	1	1	2			
Marital status	Single	7	1	8	3,717	2	0,156
	Married	40	18	58			

	Widower	8	8	16			
Phone type					8,978	1	0,003
	Standard	39	11	50			
	Senior	13	16	29			
Age					3,916	3	0,271
	55 - 64 years	27	10	37			
	65 - 74 years	20	8	28			
	75 - 84 years	7	8	15			
	over 84 years	1	1	2			

3.3 Data processing

The quantitative data from surveys in paper format were typed in Excel and transferred to SPSS Statistics v20. Five surveys were not included in the analysis because of excessive amount of missing information, otherwise outliers were not removed nor data imputation used for missing information. However, education, location, housing and age had more categories in the original survey form and some categories were combined in the data processing. Dummy variables were created for categorizing the data. In fact, the most important variable for this study, purchaser of the phone, is “1”, when the user have bought the phone herself otherwise the value is “0”. The latter value was determined if the buyer was spouse, company or respondent’s children. To test the impact of purchaser and its significance on use behavior t-tests were used, although the phone usage is neither interval nor ratio scale.

3.4 Hypotheses revisited

The original research question was the hypothesis:

- *H1: Mobile phone purchase decision made by someone else than the user herself does not impact her mobile phone use*

Based on the survey form questions about the different ways to use mobile phone main hypothesis can be divided up to ten sub hypotheses:

- *H1a: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for making calls*
- *H1b: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for reading and sending mails*
- *H1c: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for playing mobile games*
- *H1d: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for browsing internet*
- *H1e: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for participating Social Network Services*
- *H1f: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for listening to music*
- *H1g: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for using its alarm functionality*

- *H1h: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for using calendar*
- *H1i: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for using pedometer*
- *H1j: Mobile phone purchase decision made by someone else than the user herself does not impact her use of mobile phone for taking photos*

4 Results

Two independent groups of data indicated by variable Purchaser were formed. According to Levene's test for equality of variances, Mails ($p=0.349$), Alarm ($p=0.293$), Calendar ($p=0.349$) and Camera ($p=0.790$) did not have equal variances in two tested groups. Other variables had significance less than 0.05. Two-tailed t-tests were executed in SPSS giving the results presented in Table 2.

The average usage on every feature is higher in the group of self-acquired phones compared to the group in which the purchase has been done by family members, except in one case. Pedometer is more used among people who have received the phone from elsewhere. However, statistically all the differences are not significant.

Based on the results of Table 2, which depicts the two-tailed t-tests with confidence interval of 95%, hypotheses about Calls (H1a), SNS (H1e), Music (H1f), Alarm (H1g), Calendar (H1h) and Pedometer(H1i) are accepted meaning that the use of aforementioned functions do not differ statistically in these two groups. In contrast, hypotheses about Mails (H1b), Gaming (H1c), Internet (H1d) and Camera (H1j) are rejected meaning that their usage differs depending if the user has purchased the phone herself or someone else has purchased it for her.

Table 2. Results of two-tailed independent sample t-tests of mobile phone usages

Function/Purchaser	N	Mean	Std. Dev	t	df	Sig (2-tailed)	
Calls	Myself	55	3,18	1,0	1,318	39,553	0,195
	Exogenous	27	2,78	1,4			
Mails	Myself	52	2,25	1,7	2,415	77	0,018
	Exogenous	27	1,30	1,6			
Gaming	Myself	52	0,29	1,0	2,129	51	0,038
	Exogenous	27	0,00	0,0			
Internet	Myself	54	0,63	1,3	2,946	61,706	0,005
	Exogenous	26	0,08	0,3			
SNS	Myself	52	0,10	0,5	1,399	51	0,168
	Exogenous	26	0,00	0,0			
Music	Myself	52	0,15	0,5	1,421	73,321	0,159
	Exogenous	25	0,04	0,2			
Alarm	Myself	52	1,10	1,4	0,375	76	0,708
	Exogenous	26	0,96	1,6			
Calendar	Myself	53	1,26	1,5	1,439	77	0,154
	Exogenous	26	0,77	1,4			
Pedometer	Myself	52	0,44	1,2	-1,376	38,669	0,177

	Exogenous	25	0,92	1,5			
Camera	Myself	52	1,00	1,0	2,147	77	0,035
	Exogenous	27	0,56	0,6			

5 Discussion

In general mean frequencies of use in “acquired by Myself” group is higher than in the other group. This makes sense, because people who buy their own phones have probably studied the functions and use of mobile phone. As anxiety towards technology is regarded one of the hindering factors (Kurniawan et al. 2006) using mobile devices, those active older people may be more techno-savvy than the “acquired from Exogenous” group. However, during the interviews it also turned out that some older people did not know at all about the existence of certain service or function they had in their phones.

The reversed difference of Pedometer functionality can be explained using Table 1. Pedometer is a function of Fujitsu’s Raku-Raku senior mobile phone in particular. Raku-Raku phones are given more often as presents for older people, which may explain why the usage of pedometer is higher than in the other group. Additionally, Fujitsu has marketed the pedometer strongly and it is one of the strongest cards in their marketing; well-being related products are popular.

The two-tailed t-test does not directly tell if the means are bigger or smaller between two tested groups, but they are just different. One could reason from the averages on Table 2 that mailing, gaming, internet and camera use frequencies are lower when a person has received the phone from someone else. One reason for this is that older people seem to value tangible benefits from mobile technology including security. According to (Yong Gu et al. 2010) older people are interested mainly in voice communication, but not messaging and browsing. This could support that using mails and internet would inspire more those people who buy their own phones. The text messaging has been regarded as a hobby for younger people (Ling 2008), Japanese counterpart ‘mailing’ might work similarly. The camera was regarded as a disturbing feature (Kurniawan et al. 2006) in mobile phones, because it jeopardizes privacy. This may be emphasized in Japan, where privacy and respect to others are highly appreciated.

The accepted hypotheses indicate that the use patterns i.e. the mean frequencies of making phone calls, using SNS, listening to music, using alarm, calendar and pedometer functions, are similar in both groups. These are quite tangible and utilitarian functions, except Social Network Services (SNS) and listening to music, the use frequencies of which are extremely low in both groups. Table 3 summarizes the functionalities of mobile phones with information discussed above.

Table 3. Classification of functions

Function	Use level	Exogenous decision impact	Type
Calls	Normal	No	Utilitarian
Alarm	Normal	No	Utilitarian
Calendar	Normal	No	Utilitarian
Mails	Normal	Yes	Utilitarian
Pedometer	Low	No	Utilitarian
SNS	Low	No	Hedonic
Music	Low	No	Hedonic
Gaming	Low	Yes	Hedonic
Internet	Low	Yes	Hedonic
Camera	Low	Yes	Hedonic

Use level is set to “Low” if use frequencies are less than 1.00 in both groups. Decision impact has value “Yes” if exogenous decision maker has an influence on use behavior. Finally, the functions have been categorized to “Utilitarian” and “Hedonic” use. However, the use of a camera could serve both values.

Clearly, making phone calls is the main function of the mobile phone, for older people in particular. Similarly, the alarm and calendar, which have been regarded useful (Kubik 2009), are features which can be in daily use in both groups. Likewise, as reported earlier in this paper, pedometer has been a popular feature in Japanese senior mobile phones.

According to Table 3, older mobile phone users seem to prefer utilitarian use expecting tangible benefits as research literature suggests (Abascal and Civit 2001, Kurniawan 2008, Kubik 2009). The hedonic features of mobile phones are neglected by these users suggesting that older users have more efficiency needs than entertainment needs related to mobile services (Anckar and D’Incau 2002, Heinonen and Pura 2006, Nikou et al. 2011). Although, older people may appreciate efficiency, the informants of this study seem to belong to “Basic User”, which conform also the findings of a study segmenting mobile service users (Sell et al. 2010).

There are limitations in this study. The splitting the decision maker in two categories is also troublesome. There may be differences if “Exogenous” would have been divided still in two more groups; the spouse and children. Furthermore, the samples were biased in two ways. Firstly, there were more women among interviewees than men and secondly people from rural areas were older including also people having age-related problems. However, the age is probably not a good predictor of use behavior, because aging is individual and for instance, some over 80-year old interviewees in Japan were very active. In the near future, this topic will be further studied by using lifestyle indicators and taking into account also the attitudes, which were measured using semantic differentiation.

6 Conclusion

The target of this study is to promote discussion about the impact of purchase decision on the mobile phone use of mature users. Children or grandchildren may make the decision of buying a mobile phone, e.g. as a gift, for their parents or grandparents, respectively. This exogenous decision, especially without consent from receiving part, can result in a situation where the older person is not using the phone at all. However, if she has taken the phone in use, the use frequencies of different mobile phone functionalities may be lower in comparison with people who have acquired the phone themselves.

The study based on survey data (82 mature and older mobile phone users) collected in Japan. The data from informants was divided into two groups based on who had purchased the phone; the person herself or someone else. This latter buyer refers to an exogenous purchase decision maker being one of the family members. The results suggest that the use frequencies in “exogenous” group are lower within certain functionalities, such as using mails, internet and camera. However, the use frequencies making phone calls, using alarm and calendar were similar in both groups. One reason for this can be that older people value tangible benefits they get from mobile technology. Hedonistic features, such as listening to music, playing mobile games and participating in Social Network Services were in both groups unpopular. The results of the study suggest that older people seem to be mainly utilitarian by nature as far as mobile services are concerned. However, if older person uses hedonic mobile services the decision maker of purchase is with higher probability the user herself.

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