

Mobile Phone Appropriation: Exploring Differences in terms of Age, Gender and Occupation

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Abstract— This study investigates the appropriation of wireless phone technologies by building on the technology appropriation theories. To understand the patterns of wireless phone use through the concept of appropriation, the study looks into the choice of mobile phone use through various attractors, the purposes of MP use and the extent of use of various MP applications and features by the targeted users. This study also explored the influences of age, gender and occupation type on MP appropriation. The result of the study allows us to describe important elements of MP appropriation and explore the influence individual characteristics such as gender, age and occupation on different patterns of MP use through our conceptualization of appropriation. It is found that all of the individual characteristics investigated were significantly related with the MP appropriation and use. We conclude that these individual characteristic variables such as gender, age and occupation type are important moderating variables in understanding MP appropriation and use among the respondents. The results of the study are expected to assist in understanding the use of MP across different ages and occupation and serve as a mechanism in guiding the development of mobile phone applications and design by service providers and manufacturers respectively; as well as in aiding policy formulation on MP use at the work place

Index Terms—Wireless technologies, technology appropriation, wireless phone use, wireless phone adoption

I. INTRODUCTION

Mobile phone (MP) which is essentially a communication device has undergone numerous transformations making its functionalities transcending the traditional voice communication between two individuals [15]. Then, the unprecedented level of mobile phone adoption coupled with the rate at which new technological services can be deployed through the gadget; are factors motivating the day-to-day research efforts on the technology. While other wireless technologies like mobile laptops and Personal Digital Assistance (PDA) have been shown to have had significant impacts on human conducts, mobile phone technology with its unprecedented penetration has done more. But despite the widespread of mobile phone adoption across regions of the world, its usage and appropriation are poorly understood [2], [4]. In other words, there is a need to understand the use of MP beyond the concept of use and adoption.

Mobile phone usage has been studied from various different approaches. These approaches range from the marketing perspectives of mobile phone use [12], [16] to social, cultural

and public contexts use and applications [1], [18] and adoptions [13]. As the MP technology has becoming the basis of daily communication device to many societies worldwide, its complexity and sophistication have been quite intriguing to many users and researchers alike. Understanding its use is supposedly more complicated than just what the adoption theory alone can provide. Users of MP are more adaptive, definitive, and subjective to how they use the communication device (or is it just a communication device?). While the basic functions and features of the technology can be common across all communication devices in MPs, the technology itself are found varies to suit one user to another. The subjectivity in the use of the MP technology may have triggered the need to understand the use of MP as appropriated by the users. In this regard, appropriation refers to the use of the technology as designed by the designers to satisfy different purposes beyond the conception of the designer [2], [4]. Appropriation signifies how the technology is used, adapted, and fitted in the users' daily.

One appropriation process of mobile technologies has been described by [4], [5], [6] through technology appropriation model developed from their qualitative studies on teenagers. This study accounts for MP usage by establishing the link between how users take ownership of the technology and how the technology is adapted to satisfy different purposes intended by the users. Some other studies too have shown that mobile phones are use to gratify or satisfy different purposes [19], [24]. Reference [25] also proposed the notion of appropriation through object-oriented and functional usage, which are pragmatic and symbolic in nature. Their mobile phone appropriation model also elaborated on influential factors that are both functional and symbolic, and tied to various attractors from social and psychological perspectives such as norms and restrictions, and meta-communication.

Research on the usage of MP has been commonly approach through adoption and technology acceptance model (TAM) using intention to use and use. In most cases the technology need to be focused to specific MP technologies such as PDA or WAP phone [13], [23]. Given the variation in the technology within the MP which users can appropriate its use to their desired needs and purposes, more attention needs to be given in understanding usage through this point of view. Therefore, using the appropriation approach, we can understand the MP usage more meaningfully through how the technology is used, the purposes it serves, and the context of its use through choice of features and services [2], [17], [20], [25] A review of literature helps to shed some light on the limitation of the existing studies which were based on solely quantitative adoption and acceptance model [13], [23] and, appropriation perspectives which were mostly qualitative in nature [4], [25].

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While only little empirical research can be found investigating actual use of mobile phone technologies as compared to adoption studies, it is also difficult finding studies combining these different concepts of mobile phone usages as well as investigating relationship between the concepts and personal attributes of users.

In view of the above discussions, the following questions are considered to reflect a set of enquiries to be addressed by the study: (1) What is the appropriation patterns MP use among the respondents in terms of: (a) the attractors such as brand familiarity, fashion and style or physical appearance and cost influencing the choice of mobile phone ownership? (b) the common purposes of mobile phone use? (c) the frequently used features and services? (2) Are there relationships between age, gender and occupation status and the appropriation pattern variables?

II. METHODOLOGY

A. Participants and Procedures

Case study approach using survey as the data collection means was adopted by the study in order to achieve the intended objectives. The staff (academic and non-academic) and students of three academic faculties of the International Islamic University Malaysia (IIUM) were used as the study's population. The faculties are Engineering (KOE), Human Science (KHS) and Economic and Management Sciences (KENMS). Stratified random sampling was used to select respondents among the staffs, while cluster sampling was used to select respondents among the students by randomly selecting three classes which hold on same day and time in each of the aforementioned faculties.

B. Instruments

Measurements of variables used in this research were developed based on Technology Adoption Model [6], survey of mobile phone usage patterns [11], study on actual usage patterns of mobile data services [3] and survey of young people preference for mobile multimedia [17].

The questionnaire was divided into two parts. The first part (Part1) comprised questions aimed at collecting demographic information from respondents. The second part (Part 2) consists of fifty items aimed at investigating appropriation process. The 50 items were measuring attractors influencing the choice of mobile phone (11 items), mobile phone purpose of use (11 items) and usage of mobile phone features and services (28 items). Attractors were measured using a five point likert scale which comprised of (1) strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree. Then both purposes of mobile phone use and usage of mobile features and services were measure using the frequency scale of (1) never, (2) rarely, (3) sometimes, (4) often and (5) always.

C. Analysis

To ensure the validity and reliability of items measuring attractors influencing mobile phone choice for subsequent analyses, data reduction process using Factor Analysis with principle component and varimax rotation techniques were used, followed by the performance of reliability test with Cronbach Alpha for reliability score in the scale.

According to [9], a factor loading of 0.40 and above is significant for sample size not less than 200; therefore, with a sample size of 201 used in this study, items with factor loading less than 0.40 were omitted from further analysis. Also, following [8], factors with alpha value less than 0.70 were considered low in reliability and therefore omitted from further analysis. The data were then analyzed in SPSS for descriptive analyses, T-test and ANOVA

III. RESULTS AND DISCUSSION

A. Participants profile

The distributions of the respondent's profile are such that: (1) 62.2% of the respondents are male and 37.8% are female; (2) 25.3% of the respondents fall into age of between 18 and 24 years, another 25.3% fall into age category of between 25 and 35 years, then 33.3% fall into age category of between 36 and 50 years, while the rest; 16.5% are those with age above 50 years; (3) 24.9% of the respondents are students, then 16.9% are those categorized as support staff/ non-academic staff and the remaining 58.2% constitute the lecturers/academic staff. In terms of usage rate of mobile phone technologies generally; 6.5% describe themselves as very low users, 19.4% described themselves as low users, 58.7% described themselves as moderate users, and then 10.9% described themselves as heavy user while the rest 4.5% indicated that they are heavy users of mobile phone technologies.

B. The Appropriation Process of Mobile Phone Technologies

As mentioned earlier, three variables (attractors, purpose of use and usage of features and services) were used to explore the appropriation process. Only attractors was measure using likert scale, the rest two were measure using frequency scale. To answer question 1a of the study, an exploratory factor analysis with varimax rotation was conducted on the items measuring "attractors". With 0.40 as threshold, three factor emerged in the resulted rotated component matrix and a reliability test on the three factors resulted in the discarding of two factors with α values less than 0.70 and the only reliable factor ($\alpha = 0.801$) measuring attractor influencing the choice of mobile phone is termed "mobile phone physical attributes and perceived level of accentuating user's status". The items measuring this factor and their corresponding factor loading are shown in Table 1. Findings from the descriptive analyses, as depicted in the mean and standard deviation column of Table 1, indicate a somewhat slightly below average in the consideration for mobile phone physical appearance and social status accentuation among users of mobile telephone in IIUM. A look at the items measuring the variable call for further attention, three of the items: The brand name interests me to buy the phone (mean = 3.6418), I like a phone with big screen (mean = 3.4925) and, The shape

design interest me to buy the phone (3.5075) indicate that respondents are moderately high in their consideration for trust in brand and fashion and style or physical outlook of the technology. Then, Contrary to [4] finding where cost (expensive phone) was found among the factor leading to rejection of mobile phone, further analyses in this study indicate that majority of the students prefer expensive phone and love to explore the latest model of their preferred mobile phone brand. An indication that cohort group may influence what constitute these attractors.

Furthermore, to answer question 1b, a descriptive findings on the purpose of mobile phone use as depicted in the mean and standard deviation column of Table 1 indicate that there are seven common purposes of use among users in IIUM community. Respondents vary between averagely frequent to a very high frequent use of mobile phone for: family contact, scheduling purposes, emergency needs and safety, socializing with friends, collaborate with colleagues, for education purpose and for business related needs.

Lastly and answering question 1c, descriptive analyses of features and services usage depth as shown in mean and standard deviation column of Table 1 indicate that respondents are characterized by average to high frequency in their use of mobile feature and services like: SMS, alarm clock, voice call, calendar, address book camera and music.

Further analyses exploring the relationship between the identified variable of mobile phone appropriation and three personal characteristics (age, gender and occupation or duty status) in the next section are expected to shed more light on the appropriation patterns among different cohort used in the study.

Table 1: Variables of Mobile Phone Appropriation Process

Variables and Items	Mean	Standard deviation	Factor loading
Mobile phone physical attributes and perceived level of accentuating user's status ($\alpha=0.801$)			
The brand name interests me to buy the phone	3.6418	1.15371	.524
I like expensive phone	2.5721	1.12518	.631
I love changing my phone to the latest model	2.1244	1.10881	.635
The colour of the phone interests me to buy the phone	2.6020	1.18355	.792
The screen colour interests me to buy the phone	2.8905	1.21159	.753
I like a phone with big screen	3.4925	1.14070	.614
The shape design interests me to buy the phone	3.5075	1.10959	.738
Average	2.9758	.77567	
Common purposes of mobile phone use			
To contact family	4.6119	.61535	
For scheduling purposes	4.1194	1.06098	
For emergency contact or personal safety	4.0299	1.04360	
To socialize with friends	3.9900	.98484	
To discuss with colleagues (job related)	3.6169	1.13469	
For education purposes	3.0547	1.26964	

For business-related purposes	3.0299	1.28028
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Frequently used features and Services

SMS	4.4776	.88924
Alarm clock	4.0796	1.21804
Voice Call	3.7612	1.44315
Calendar	3.5124	1.36422
Address Book	3.4080	1.42223
Camera	3.1791	1.43449
Music	2.7960	1.55666

A. Age and Appropriations Variables

The relationship between three personal characteristics (age, gender and occupation) and the identified appropriation pattern was explored using the analysis of variance (ANOVA). The analysis gives a significant different among different age groups in terms their choice for physical appearance and its role as a means of social accentuation. Respondents between the ages of 18-24 (mean = 3.29) and those between the ages of 25-35 (mean = 3.14) place higher preference for this attribute in their choice of mobile phone than those with ages above 35. This may be explained by the likelihood of these age groups to engage more in social activities as well as being more conscious about fashion and style.

In line with the study's hypothesis, age was found impacting significantly on all the common purposes of use identified in the study. As expected, all the respondents show a very high use of mobile phone for family contact, but those with ages between 25-35 (mean = 4.80) and those between 35-50 (mean = 4.67) show significantly higher use for family contact, followed by those with age 18-24 (mean = 4.51) and those above 50 years (mean = 4.38). While all respondents greatly value the technology for this purpose, the differences in their mean values may be explained by the fact that those whose ages are between 25 and 50 have multiple roles to play in the coordination of family affairs. Among these roles is the need to coordinate children's movements, contact spouses, and reach out to extended family member and in particular; to give necessary assistance to the aged ones.

In the case of mobile phone use for scheduling purposes, the significant difference can be observed between the first three age groups and those with age above 50. The inverse trend between age and mean value for this purpose of use may be explained by the degree of responsibility to superior ones among the respondents and the need to use the gadget to meet up deadlines or targets. Cross tabulation of age and occupation status shows the two age groups with the highest mean values; 18-24 (mean = 4.55) and 25-35 (mean = 4.31) are students and non academic staff respectively. In an academic environment, these two groups may feel more responsible to the targets of the third group (lecturer or academic staff) than vice-versa.

In the same vein, the use of mobile phone for emergency needs and safety, socializing with friends, collaborate with colleagues and for education purpose follow similar trend with a significant difference among age groups. It is observed that as age group increases, the usage of mobile phone for these purposes decreases. This may imply that respondents with younger age engage more in social activities and rely more on

one another for task or study accomplishment than the elder ones.

The significant difference in the use of mobile phone for business related purposes can be observed between those with age 25-35 and 36-50 on one side and those with ages 18-24 and above 50 on the other side. While respondents between 25 and 50 year show an averagely high use for business, those with age above 50 fall slightly below average and the least are those with age between 18-24 (mean = 2.61). This result is expected in an academic environment where the active working groups are between the ages with the highest mean values, and the students are expected to give priority to their study than business engagements.

Analysis of variance gives significant differences in the frequency of using SMS, Alarm clock, Calendar, Camera and Music by age. The significant differences observed in usage frequency of SMS, alarm clock and calendar follow the same trend where the youngest age group (18-24) is significantly different from those in the age groups 36-50 and above 50, while the age group 25-35 is significantly different from those above 50 years of age. Though as age increases, the usage frequency of these features and services tends to decrease, the difference becomes notable when the age difference is large. A likelihood explanation for this trend may be in the desire to engage more in socialization by the youths; of which camera is greatly valued and which SMS encourages virtually because of the cost effectiveness. Then the need to meet up with different responsibilities which; alarm clock and calendar can help to manage as those in age groups 18-24 and 25-35 have earlier been confirmed through cross tabulation to be mostly student and non-academic staff respectively and are more responsible to the rest groups. Furthermore, the significant difference in the usage frequency of using the mobile phone to listen to music is such that respondent in the age group 18-24 (mean = 4.20) who are mostly students are significantly different from the rest age groups: 25-35 (mean = 2.94), 36-50 (mean = 2.22) and above 50 (mean = 1.81). This may imply that the student use the technology greatly to entertain themselves more than the rest groups.

B. Gender on Appropriation Variables

Analysis of variance conducted on gender against all the variables of appropriation (attractors influencing mobile phone choice, common purposes of mobile phone use and usage of mobile features and services) in the study showed significant differences between genders in some of the common purposes use and usage of features and services. As for the common purposes use, the significant differences are observed in the use of mobile phone to: contact family, for scheduling purposes, for emergency needs and safety and to collaborate with colleagues on education or job issues. Looking at the mean values it can be seen that female have higher mean values in all of the common purposes of mobile phone use; implying that females use the technology for all the purposes more than the males. This result is partially in line with an earlier study by [21] which found women in Malaysia to be significantly different from men in the usage of mobile phone for family contact and scheduling of activities.

Furthermore, the analysis also reveals significant differences between genders in the usage depth of mobile phone features and services like; SMS, Alarm clock, Camera and Music. Similar to the former analysis as depicted in mean and standard deviation columns of Table 3, women also have higher mean values compared to men in the usage frequency of these features and services. These results may help to explain one another better; a look at some of these features and services like SMS and alarm clock shows that SMS usage depth can facilitate frequent family contact and easy scheduling or vice-versa. Also, alarm clock is a feature of the mobile phone mostly used to guide schedules. The result is also similar [21] finding, where Malaysian women were found to be significantly higher in the usage of SMS, alarm clock, address-book and camera.

C. Occupation Type and Appropriation Variables

Occupation type is used in this study to group the respondents into three groups namely: student, non-academic staff and academic staff. Analysis of variance shows significant differences among these groups in the variable measuring what influences the choice of a particular phone, five purposes of mobile phone use and six frequently used features and services.

A look at the significant differences in terms of consideration for mobile phone physical attributes and perceived level of accentuating user's status in the choice of the technology shows a significant different between students and non-academic staff (mean = 3.29 and 3.15 respectively) and academic staff (mean = 2.79). Further analysis using cross tabulation reveals that all the students and some of the non-academic staff fall in the age range of 18 and 35 years which have earlier been found to engage more in socialization. Therefore, this may suggest that those who engage more in socialization are likely to consider mobile phone with attractive physical look as well as other qualities of the gadget (an example is high cost) that are perceived as means towards accentuating their social status.

As for the differences in terms of purposes of mobile phone use, significant differences were observed as shown in Table 4 in the usage of mobile phone for: scheduling purposes, emergency needs and personal safety, socialization, education needs and business-related purposes. A look at the mean and standard deviation columns reveal the level of importance of the technology to satisfy different needs among the three groups. The student and the non-academic staff (mean = 4.56 and 4.53 respectively) are significantly different from academic staff (mean = 3.81) in the use of mobile phone for scheduling purposes. As explained in the previous section, these two groups (students and non-academic staff) are likely to be more responsible to the targets or delegated duties of the third group (lecturer or academic staff) than vice-versa in an academic environment; and need to use the gadget more for scheduling so as to meet up with various obligations. In the same trend, students and non-academic staff (mean = 4.30 and 4.38 respectively) were found to be significantly different from the academic staff (mean = 3.81) in the use of the technology for emergency needs and safety. As explained under the age influence, the previous two groups are likely to engage more in individual outings mostly for socialization or task

accomplishment and are likely to be in the need of the gadget for safety and emergency needs.

As for the use of mobile phone to socialize with friends and for education purposes, the students (mean for socialization = 4.44 and mean for education purposes = 3.68) are significantly different from the non-academic and academic staff (mean for socialization = 3.79 and 3.85 respectively and mean for education purposes = 2.88 and 2.84 respectively). A likely reason for the differences may be that students who can all be categorized as youths engage more in social activities and being students, use the technology to collaborate things like assignment, group project, class presentations and so on.

Lastly, on the use of mobile phone for business related purposes, the non-academic staff (mean = 3.29) and the academic staff (mean = 3.15) are significantly different from the students (mean = 2.58). As expected, the tendency to engage in business transaction are likely to be higher among the working population which non-academic and academic staff fall into; than the student who are mostly dependent on their parents.

Analysis of variance between occupation and frequently used features and services of mobile phone technology shows significant differences in the frequency of using SMS, alarm clock, calendar, address book, camera and music. The differences observed in frequency of using SMS, alarm clock, calendar and camera are similar; the general observation is that, while no significant difference is observed between the student and non-academic staff, there are significant differences between the students and the academic staff as well as the non-academic staff and academic staff. As earlier mentioned, SMS, alarm clock, calendar [21] and camera have been found to be among the features and services of mobile technology influencing socialization and scheduling of activities positively and which have been found in this study to be among the purposes common among those whose ages are between 18 and 35 years, therefore, the lumping together of students and non-academic staff against the academic staff in the frequency of using these features and services may be attributed to age distribution among the respondents.

Furthermore, the analysis on the frequency of using mobile address-book as shown in Table 4 depicts that the non-academic staff (mean = 4.06) are significantly different from students (mean = 3.40) and academic staff (mean = 3.22) with no significant difference between the students and academic staff. This output may be explained by previous findings in the study, most of the non-academic has been found via cross tabulation to be in the age range of 25 and 36 years, analysis have also shown that they highly engage in socialization and moderately engage in business activities, therefore, combining these attributes; they are likely to have higher contacts with different people physically or virtually on daily basis and may engage the use of address book to keep track of contacts for reference purposes.

Lastly, analysis of variance shows significant differences in all the three groups in the frequency of using the technology to listen to music. As expected, the student (mean = 4.20) somewhat always use the technology to listen music, while the non-academic staff (mean = 3.29) moderately use the technology for music and the academic staff (mean = 2.05) rarely use the technology for music. Based on cross tabulation

of age and occupation, this output further explains that; when it comes to entertainment or leisure, the younger the age, the more the likelihood of engaging the mobile phone to gratify the purpose.

IV. DISCUSSION AND CONCLUSION

This research attempts to investigate the appropriation pattern of mobile phone technologies in terms of “attractors” influencing the choice of mobile phone ownership, the common purposes of mobile phone use and the frequently used features and services and tested the influences of age, gender and occupation on the appropriation patterns among cohorts of people in an academic environment.

Reference [22] asserted that perceived attributes of innovations are significantly associated with the adoption rate and are significant determinants influencing attitudes formed towards the innovation. Consequently, [6] identified brand familiarity and physical appearance to be among the attractors of mobile phone. Similar to these earlier studies, mobile phone physical attributes and perceived level of accentuating user’s status was found as a factor of consideration prior to purchase among the study’s participant.

Furthermore, some earlier studies have found the use of mobile phone for different purposes among which are; the use for social purposes such as family and friend contact [24], the use for social management, safety and security, information management and life style organization [4] and the use for hedonic, utilitarian and social values [3]. In consistent with these earlier studies, this study found the use of mobile phone technologies for: family contact, scheduling purposes, emergency contact and personal safety, socialization, collaboration with colleagues, knowledge seeking purposes and for business needs. These results which fit into different categories of use found in earlier studies contributes to our knowledge that the use of the technology in Malaysia is similar to what is common in some other parts of the globe.

Lastly on the appropriation pattern, four features and three services were found in the study as the frequently used features and services among the respondents. These services are: SMS, voice calls and Music, while the features are: alarm clock, address book, calendar and camera. These identified features and services reflected the common purposes of use identified in the study and some of those purposes of use identified in previous studies like; [3], [4], [24]. Reference [24] found SMS usage to be more prevalent among other services in Australia of which this study carried out in Malaysia also supports.

The hypotheses testing on the influence of age, gender and occupation on the appropriation patterns used in the study have most of the hypotheses supported except for few. The influence of age has been shown in many technology adoption researches [7], [10], [23]. Reference [26] indicated in a study that age may influence technology use in multiple ways; one of these ways is the indirect influence of age on technology use through perception. This study also found that younger respondents have higher perception about the technology’s outlook and as an identity symbol.

Studies have found significant decreases in the usage of different technologies as age increases [14], [26]. In

congruence with these previous studies, age influence was significant on almost all the common purposes of use and frequently used features and services identified in this study with usage rate inversely proportional to age except for few purposes of use and features.

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