

**A Study on the Acceptance of Mobile Information Services
and Their Contribution in Needs of Life**

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Abstract

Mobile information services are advanced data services that we have look and feel of Internet pages and accessible via mobile phones with 3G+ mobile communication networks. The adoption of mobile information services by customers has a potential to fulfill their needs that lead to the improvement of their quality of life (QoL) and also to the increase in revenues and profits for firms. For long-term profits for firms, it will be necessary to focus on users' QoL. The expansion of mobile information services depends not only on technological advancement but also on the adoption of the services on the side of the users.

The behavioural intention to use by a customer is a predictor of adoption of mobile information services, which is an economical or organizational outcome for a firm on their marketing efforts and QoL is a predictor to understand how mobile information services are Improving QoL by fulfilling the needs of users' life, which is a social outcome for a customer. However, there are not many researches on the adoption of mobile information services. Thus, to fill this knowledge gap, this study has attempted to identify the factors on user's adoption of mobile information services, especially in technologically diverse environments among different countries. The purpose of this research is to elucidate as follows: 1) to classify the need structure of mobile information services; 2) to identify the factors that influence the behavioural intention to use mobile information services; 3) to find out the similarities and differences in behavioural intentions to use mobile information services in diverse environment, specifically by cross-country and cross-temporal studies; and 4) to understand how mobile information services contribute to fulfill users' needs of life by improving QoL.

This study identified similar need structures of several mobile information services for two leading developed countries, Japan and USA, as of 2009 by factor analysis, confirming the primary factors of the mobile information service needs as follows: Information intensiveness (Factor 1), entertainment (Factor 2), low penetration service (Factor 3), and communication service (Factor 4). Factor 2 represents services with entertainment characteristics such as games, music, and ringtones. The finding of this study shows that mobile users in Japan 2009 and USA 2009 have roughly the similar needs in the mobile entertainment service category with the second highest penetration rate after the needs of the communication service category, on which there are many researches.

Following the research that roughly confirmed the similar needs structure of the entertainment service category for Japan in 2009 and the USA in 2009, this study also identifies the factors that influence behavioural intention to use mobile entertainment services. A modified technology acceptance model-theory of planned model (TAM-TPB) was utilized by Kondo and Ishida (2014) for cross-national (Japan vs. the USA) analyses on the intention to use multiple mobile entertainment services data for Japan in 2009 and the USA in 2009. A TAM-TPB model is applied in many areas and is a well-developed theoretical model, in which a covariance-based structural equation model (CB-SEM) is suitable. Adoption of mobile entertainment services was still at the early stage before the expansion that began with the introduction of the iPhone 4 in Japan and the USA in 2010. Furthermore, this study considered that Bangladesh's adoption of smartphones, 3G services, and entertainment services in 2014 is at the same introduction stage as those in Japan and the USA in 2009. Most of the mobile entertainment technology adoption researches have been established based on the data from the contexts of developed

countries. There are few studies on mobile entertainment services that have designed models to serve developing countries. The use of mobile entertainment services at present is growing, but limited in developing countries. Therefore, in focusing on an innovative information technology artifact (mobile entertainment), the application of behavioural intention model to data obtained from a developing economy is worth investigating.

Therefore, in order to confirm the reasoning, this study has also been conducted in the context of a developing country such as Bangladesh during 2014. This study found the result that perceived behavioural control, perceived value, and attitude are positively significant determinants and important indicators of behavioural intention. Also, perceived behavioural control has direct positive influence on perceived value, and perceived value has direct positive influence on attitude. For this study, three additional constructs of perceived fun, perceived convenience, and perceived ease of use were added to the model, but they were not supported. This study revealed that the economic outcome (adoption of mobile information services) with attitude, perceived behavioural control, and perceived value could be applied to understand young behavioural intention to use mobile entertainment services. Almost the same results have found in the cross-country comparison study of mobile entertainment service use intention between Japanese young adults as of 2009 and Bangladeshis as of 2014; thus, this pattern can be considered as universalities or generalities of mobile service use for young users. The result provided an interesting implication that the TAM-TPB model could be applied in both developed countries and a developing country after the adjustment of technology diffusion timing.

This study was conducted also in the context of time difference in Japan between in 2009 and in 2014. The research results for Japan in 2014 obtained different results from

those for Japan 2009. Perceived value has an indirect effect on the intention to use via attitude, but perceived value and attitude were not significant predictors to behavioural intention in Japan, 2014. Perceived behavioural control was a significant predictor for behavioural intention to use mobile entertainment services, but perceived behaviour control had no effect on intention via attitude in Japan 2014. This study found that when the usage behaviour of mobile entertainment services was not a regularly patterned behavior in Japan 2009, behavioral intentions appear to reflect the person's behavioural intention through attitude. In contrast, at levels of past behaviour increased with experience, users become absorbed in their activity and they feel experienced, skilled, confident and in control of their usage behaviour of mobile entertainment services in Japan 2014. When a user becomes familiar with mobile entertainment services (smartphone browser games) in Japan 2014, the user is rarely attracted to new games because of his or her immersion in the first. Such immersion proves that perceived behaviour control directly affects a user's behavioural intention. On the other hand, once the benefits and the efforts needed to use mobile entertainment services have become more common practice, perceived value may play a less critical role in determining behavioural intention in Japan, 2014. Mobile entertainment services via 3G/4G or smartphone (ex. smartphone browser games) is not a new idea for Japanese participants in 2014. Since smartphone browser games, charging platforms called "i-mode" and so on are a relatively common practice and its perceived value has been acknowledged widely, mobile users in Japan 2014 may have been relying on their existing knowledge, as opposed to whatever additional knowledge the mobile marketers are providing. These researches suggested that the framework of TAM-TPB has been fairly useful to envisage the behavioural intention to use mobile

entertainment services among the global young segment, which indicates that the usage behaviour of mobile entertainment services has similarities among young segments across borders (Japan in 2009 and Bangladesh in 2014) and differences across different time periods (Japan 2009 and Japan 2014). Therefore, concerning the impact of perceived value, perceived behavioural control, and attitude on the intention to use mobile entertainment services, the interaction between the later-emerging market and early-emerging market dimensions leads to choices on what factors need to be customized for a given market.

This study also confirmed the contribution of mobile information services to improve QoL by fulfilling users' needs in different life dimensions for Japan in 2013. As long as a mobile company serves its users' well, it becomes profitable in the long run. There are lots of QoL researches on economic, social, behavioural and health-care perspectives. There is little QoL research on behavioural science of mobile information service dimension. This study grounds the research framework from Choi et al. (2007) with their eleven individual life domains: leisure life, family life, friend life, cultural life, work life, community life, user life, financial life, health and safety life, and self-life. This study adds four variables from prior researches, home-healthcare, trustworthy, informational, and education to the current knowledge on the impact of mobile information services on QoL in the study Choi et al. (2007). A modified bottom-up spillover hierarchy model has been used to know how the usage of mobile information services contributes to improve QoL by PLS (partial least square)-SEM method due to the non-matured nature of the model with many constructs and a small sample size. Choi et al. (2007)'s study was on mobile services for Japan in 2006 or before, where 17% of Japanese respondents were below the age of thirty; this study was for Japan in 2013 with 97% of Japanese respondents being below the age of thirty. QoL as a

social outcome in this study provides a framework to understand the contribution of mobile information services to young users' QoL. It was noted that six significant individual life domains were verified in this study (work, leisure, cultural, educational, informational, and friend life). These life domains are relevant to mobile computing environments that contribute in multiple ways to various facets of a young user's life in Japan. The newly added variables, informational and educational life, are also significant in the study's QoL research model. This study obtained the same results as those in Choi et al. (2007), the significant effects of the Cultural and Leisure life on the Overall Contribution for Japan. The result for Japan in 2013 has shown significant effect on Friend life and Work life, whereas their results were insignificant in Choi et al. (2007). This may be possible due to the characteristics of samples such as age, gender ratio and changes in mobile technology between the time periods.

The goal of this study is to identify the factors on user's adoption of mobile information services, especially in technologically diverse environments among different countries. Firstly this study classified the need structure of mobile information services. Secondly this research identified the factors that influence the behavioural intention to use mobile information services. Thirdly, this study found the similarities and differences in behavioural intentions to use mobile information services in diverse environments, specifically by cross-country and cross-temporal. Fourthly, this research has shown the contribution of mobile information services to fulfill users' needs, leading to an improvement of their QoL. The study suggests some crucial factors that manipulated the influencing behaviour and QoL of mobile information services users. Based on the study findings concentrated on influence of attitude, perceived value, and perceived behavioural

control on behavioural intention, marketers need to identify strategic gaps to provide effective mobile information services facilitating use by young segments. This study finding also has shown that mobile marketing has an extremely important role in the enhancement of the QoL through assessing young users' needs on cultural, leisure, friend, work, informational and educational life aspects and guiding the forces of service development in improving the needs in those dimensions. The most significant contribution of the study lies in providing critical insights in customer's usage behaviour mechanism research in mobile information service systems by modeling its effects on economic or organizational (adoption) and social (QoL) outcomes. Overall this study pointed out the key issues of usage behaviour evaluation in association with social (QoL) and economical (adoption) outcomes' perspectives. The bottom-up spillover hierarchy and the TAM-TPB models reflect the customer's use of the mobile services to achieve well-being of customers by QoL as well as the benefits of mobile companies through increasing adoption. The study findings have significant potential on improving the financial performance of mobile service providers and QoL of mobile information service users.

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List of Abbreviations

MIS= Mobile information services

MES= Mobile entertainment services

IT= Information technology

IS= Information System

QoL= Quality of Life

TRA= Theory of reasoned actions

TPB= Theory of planned behavior

TAM= Technology acceptance model

TAM-TPB= Technology acceptance model - theory of planned behavior

CR= Composite reliability

AVE= Average variance extracted

SIC= Squared Inter Correlation

RMSEA= Root mean square error of approximation

GFI= Goodness-of-fit statistic

AGFI= the adjusted goodness-of-fit statistic

CFI= Comparative fit index

TLI= Tucker-Lewis index

AIC= Akaike Information Criterion

BCC= Browne-Cudeck Criterion

KMO= Kaiser-Meyer-Olkin

Chapter One

Introduction

1.1 Overview

This chapter introduces the PhD thesis entitled “A Study on the Acceptance of Mobile Information Services and their Contribution in Needs of Life” and the research study reported herein. Section 1.2 provides the background and the research problem. Section 1.3 and 1.4 introduces the research keywords and research importance. Section 1.5, 1.6 and 1.7, respectively presents the framework, strengths, uniqueness and the objectives of this study. Section 1.8, 1.9 and 1.10 describes the interconnection, importance and contexts of the objectives. Section 1.10 and 1.11 gives the necessary models and method in which this study was undertaken. Finally, the structure of this thesis is presented in the section 1.12.

1.2 Research Background and Problem

Nicolas et al. (2008) defined mobile information service as advanced data services that have look and feel at Internet pages and accessible via mobile phones at 3G+ mobile communication networks. The users pay for their desired mobile contents or services. They may not pay additional fees for the access to excessive services. These services include mobile searches, news and sports information, music and video downloads, e-mail, instant messages, etc. Mobile information technologies and services worldwide are heralded to create a tremendous spectrum of business opportunities. Mobile phone services offer a wide range of purposes from business to entertainment. Mobile technology is the other most important driver of the information society. Mobile phones are one of the most widely embraced technological devices in the user market. Mobile phone provides users with

contents and services that suit their needs anywhere and at any time. Mobile information services in emerging markets are empowering citizens with social and economic choices that many never dreamed of having. People in emerging markets are adopting mobile services where, traditionally, there were few notably services available to them. Almost everywhere we can see people using mobile phones, not only for making general phone/video calls or using Short Message Services (SMS) but also playing mobile games, downloading music, accessing the Internet and much more. Such advanced mobile applications are generally labeled mobile services (m-services).

A mobile phone has become a ubiquitous tool in technologically developed or developing places all around the world. There are nearly 7 billion mobile subscriptions worldwide according to the estimates by the International Telecommunication Union, 2014. This is equivalent to 95.5 percent of the world population. Mobile market growth is being driven by demand from the developing world, led by rapid mobile adoption in the world's most populous nations. There are 5.4 billion mobile subscriptions in the developing world – that's 78 percent of global. Mobile penetration in the developing world now is 90.2 percent, but there is still potential for growth. On the other hand, mobile subscriptions in the developed world are rapidly reaching saturation point. There are 1.5 billion subscriptions in developed nations with 120.8 percent mobile penetration. There is already more than one mobile subscription per person in developed nations. The use of mobile devices is increasing rapidly, and devices based on mobile technology are commonplace in everyday life. A mobile information service is defined as use of the Internet via a handheld device (Cho et al. 2005). The user may pay for some desired mobile content or services and some are free to use. It seems that there is a good opportunity for mobile services business.

Mobile wireless industry has started its technology creation, revolution and evolution since early 1970s. The first commercially automated cellular network (the 1G generations) was launched in Japan by NTT (Nippon Telegraph and Telephone) in 1979. Within five years, the NTT network had been expanded to cover the whole population of Japan and became the first nationwide 1G network. The First generation has fulfilled the basic mobile voice. The second generation of mobile networks which were the next stage in the development of mobile communication denoted as "2G" after 1G and has dealt with capacity and coverage. 2G was started at 1980's and completed at 1990's which were mainly for voice transmission. The third generation of mobile communication system denoted as "3G" was introduced in 2000. The main features of 3G is that it allows higher data transmission rates and increased capacity for traditional voice call and high speed data applications such as Global Roaming, Internet, mobile, video conferencing, video calls and 3D gaming. The fourth generation of mobile communication system denoted as "4G" stands as an acronym for fourth generation communication system which describes the next step in wireless communication and was introduced in 2010. 4G is called as MAGIC as M=mobile multimedia A=any time anywhere G=global mobility support I=integrated wireless solution C=customized personal service. The significant features of 4G technology are video conferencing, location based services, tele-medicine, high security, speed, capacity and low cost per bit. By Reshma et al. (2013) 5G should build an important role with more services, data, use and benefits to the upcoming generation over 4G. 5G will be smarter technology with no limits and to interconnect the whole world without limits. The upcoming life style will be different with uninterrupted access of information and interconnection. The 5G is called as Real world wireless or worldwide wireless web because it does not require

limitations (Singh et al. 2012). In the past few decades, mobile wireless technologies have experienced three or four generations of technology revolution and evolution, namely from 1G to 5G.

Along with the popularity of mobile devices and advances in wireless technology, mobile information services have become more and more prevalent. They are designed to educate, entertain, and assist users in their daily lives. Although there are now a large number of mobile services, the acceptances of many advanced mobile information services have been slower than expected (carlsoon et al. 2006) such as the adoption of mobile entertainment services in developing countries (ex. Bangladesh). Prevalence of mobile information services depends not only on technology advancement but also on user adoption and intention behavior. Also one of the objectives of mobile service marketing is to increase adoption/acceptance or usage intention of mobile information services among the users. But the research on mobile information services adoption is still in the infancy or developing stage.

Therefore, I am interested in forecasting the usage nature of current or potential users especially for a technologically advanced country (ex. Japan) where usage intention/adoption/acceptance of mobile information services is at growth stage and technologically developing country where mobile information services (ex. entertainment) have not adopted much. In a technologically developing country, mobile information service market is growing but limited and also 3G and smartphone services have just introduced in there. If the factors those may influence the usage intention/ adoption/ acceptance of mobile information services can be identified both for developed and developing spaces; by focusing on the development of these factors, future actual usage can be increased and user

needs and market demand will can be fulfilled. These will make profitability for mobile companies with great productivity and also the enjoyment needs of user's will be fulfilled and this will improve user's life also. Understanding the usage intention/ adoption/ acceptance of mobile information services is necessary to obtain current and potential users and to forecast their actual usage behavior. Behavioural intention to use is the antecedents of actual behavior (Davis, 1989). It can be used to forecast the actual usage behavior of current and potential user. Thus, the increase in acceptance or adoption or intention to use mobile information services is considered to increase the actual usage of these services.

To make the importance of adoption or acceptance of mobile information services easy to understand, the example of the adoption of hamburger in France can be explained. Fantasia (1995) noted, hamburgers were unknown to the masses in Paris except to the fashionable elite. As with many contemporary food fads, the French adoption of the hamburger began among the style-conscious new service class who use food as a marker of social position. The burger in France, as elsewhere, is moreover, the favored food of the young: Fantasia (1995) reported that almost four-fifths of paying customers in a survey in 1989 were less than 34 years of age. In interviews, the young burger-eaters confirmed a love of the Americanness of fast-food outlets. The emergence of the fast food experience in France was found to be culturally and socially decontextualized. Multinationals like McDonald's established burger outlets which play up their American difference (despite making some interesting minor cultural adjustments, like abandoning standard issue fixed seating in favor of movable chairs, selling beer with burger, etc.). When they did increase adoption of hamburger in France, French food conglomerates happily combine fast food

outlets with gourmet restaurants and cheerfully borrowed American production techniques.

Past researchers on mobile computing have explored the implications of mobile commerce for markets and marketing (Balasubraman et al. 2002) investigated value creation in mobile commerce (Anckar and Incau, 2003) and developed business models for mobile commerce (Yuan and Zhang, 2003). Some researchers have also focused on the adoption of mobile commerce services (Bruner and Kumar, 2005; Nysveen et al. 2005; Pedersen and Ling, 2002; Pedersen, 2005; Rao and Troshani, 2007). While there has been an increasing availability of mobile information services, limited attention has been given to user adoption of advanced mobile information services. The mobile information services can also be classified as either utilitarian or hedonic, depending on the way they are used and the motivation behind their use (Bohlin et al. 2003). The hedonic (intrinsic) and utilitarian (extrinsic) value components frame the behavioral intention mobile information services (Holbrook, 1994). In recent years, the use of mobile phones has moved beyond point-to-point voice communications to a variety of content services. Among these mobile content services-communication, information, entertainment, and commerce services-entertainment services are currently the dominant driver of data traffic.

Mobile entertainment is any type of leisure activity consumed via mobile devices (Wong and Hiew, 2005) that utilizes the wireless telecommunication network which incurs a cost upon usage and interacts with service providers. Millions of people use their mobile devices for play (Danet et al. 1996). Mobile phone usage in this context is an enjoyable activity that allows for an escape from reality. Users of these services may perceive mobile phone usage as more entertaining than informative (Zhou, 2002). Pleasure significantly

affects mobile services usage in mobile marketing (Kondo et al, 2011). Entertainment was one of the most important characteristics among all information aspects (Entertainment, Informativeness, Irritation, credibility) that affect attitudes toward mobile advertising (Tsang et al. 2004). However, there are few researches those have been conducted covering the mobile information (ex. Entertainment) services for developing country context. As example, Akhter et al. (2013) confirmed that mobile health service quality has a significant impact on satisfaction, continuance and QoL in the context of a transformative for a developing country context, i.e. Bangladesh. The present study is an ample step in covering this gap. A key to the understanding of mobile entertainment services acceptance/adoption is the identification of the factors relating to their behavioural intention about how they will use mobile Entertainment services that will lead to actual usages.

From marketing, the authors (Sirgy, 1982; Sirgy, 1985), construed quality of life (QoL) in terms of long-term life satisfaction/improvement and argued that the relative "goodness" of a marketing program can be assessed in terms of its relationship with long-term satisfaction/improvement. Thus, QoL provides a certain kind of "value" that is equivalent to a product in terms of marketing. In case of mobile information services, it is needed to know how these services are related with the improvement of quality of use's life to add certain values in terms of mobile marketing. A QoL study has been an emerging discipline in the behavioral sciences. Interests in QoL were spread to apply behavioral researchers who are interested in how specific business practices affect QoL. Although much has been written about quality of life in marketing, no work so far has articulated the significance of the QoL concept in light of usage behavior of mobile information services with current usage knowledge.

The search for growing profit opportunities leads to careful analysis of trends in the structure of markets. Markets are defined as having four major components, among them this study will focus on the two components: people and their needs and their willingness to buy. This study will consider behavioural intention as the willingness to use mobile information services and QoL as to understand their needs related with mobile information services. Mobile information service business's responsibility is also to contribute to the QoL of its users, which is a general sense of well-being, life improvement, general happiness, beyond meeting market demand (Strumpel 1973). That is, mobile information service business is now expected to contribute to the social, as well as the economic, welfare of society. Today, mobile marketing's primary focus can be viewed as enhancing human well-being by satisfying user needs (Kotler 1980). Mobile information service businesses cannot simply sell services they "happen" to make. As because user's behaviors are guided or motivated by a sequence of needs (Maslow, 1943), mobile business have to engage in research in order to understand human needs and wants, and to deliver services that can satisfy important needs in such a way as to enhance the QoL of a certain user segment.

If user feel that mobile information services are improving their life by improving individual life aspects (work, leisure, educational, safety, etc.), they will be more intend to use or reuse these services. Therefore, the research on whether the effect of mobile information services on quality of user life is related with current and potential user's usage intention is important. In a qualitative study, Fournier and Mick (1999) found that overall product/service satisfaction is invariably intertwined with life satisfaction. As noted by Suldo and Huebner (2004), a positive life satisfaction reflects a tendency to

experience life in satisfying ways. Hence, different levels of life satisfaction would very likely to have an impact on other behavioural responses as well. Thus, it is necessary to examine QoL in the case of studying the acceptance/ adoption/ behavioural intention of mobile information services. Although many researchers have done about quality of life (QoL) in marketing, not many works so far has articulated the significance of the QoL concept in mobile information service business and in relation to specific life aspects to guide strategic mobile marketing planning.

One of the life issues that should be considered in relation to behavioural intention is an individual's life satisfaction, which refers to his or her self-assessment of his or her current quality of life (Day, 1987). People who are highly satisfied with their lives are more predisposed to experiencing positive motivation or intention or emotions than those who are not (Oishi and Diener, 2001). The aforementioned premise signal that people who are highly satisfied with life by using mobile information services are more likely to manifest more discretionary behavior intentions because they are already amply rewarded in most aspects in their lives, such as leisure, friends, and work lives. Furthermore, with the growing importance of mobile information services, this issue becomes even more critical. Thus, this study examines not only the acceptance or adoption or intention behavior to use mobile information services but also how effective it is at fulfilling the needs of user's life. This study will introduce to mobile marketers the newly emerging concepts of how user user's behavioural intention to use mobile information services are influencing, how mobile information services contribute to QoL and show how this concept can guide strategic mobile marketing planning.

1.3 Interconnection between the Acceptance of Mobile Information Services and QoL

The rational for selecting the area “acceptance of mobile information services and their contribution in needs of user’s life” has explained in section 1.1. The research framework has explained in 1.2. This section will describe the behavioural intention, QoL and their interconnections. Behavioural intention is a predictor of acceptance or adoption of mobile information services and QoL is a predictor of how mobile information services are fulfilling the needs of user’s life. User’s perception regarding use of mobile information services enhances behavioural intention and QoL concepts. Behavioural intention measures alone are not sufficient to mobile marketers as user usage behavior outcome. Because the business objectives not only increase adoption (economic outcome) mobile information service usage but also makes long-run profit. To make long-run profit, it is also needed to focus on user’s well-being such as QoL. As long as mobile information service business can serve users well, it will make long-term profit. Exchange process in business (Vargo and Lusch 2004) should need to focus on economic (i.e., adoption) and social outcomes (i.e., QoL). Thus, this study will focus on behavioural intention and QoL.

User’s behavior mechanism may have the potential to influence the economic outcomes of profitability and market performance (Zeithaml, 1988), as well as social outcomes such as QoL (Fennell, 1987). Straub and Watson (2001) indicate that any technology based service platform should focus on increasing the quality of its users’ lives. Fennell (1987) noted that QoL need to address when examining product/service usage decision making. Also behavioural intention is an important measure of usage decision making. Thus, this study uses both the behavioural intention and QoL concepts those will enrich the

understanding of user's usage behavior. In information system (IS) researches, the behavioural intention predicts actual usage (Davis, 1989). In the model of past use behavior – satisfaction – loyalty study by Kondo et al. (2010), past use behavior refers to what extent customers spend a particular amount for using specific information service. Satisfaction refers to the evaluation of actual information services that customers have used. Loyalty refers to what extent customers have the intention to use specific information services on a continuous basis. Akter and Hani (2011) simplified the relationships of quality dominant decision making process for a transformative service platform (e.g., mHealth care) with an effect on economic (i.e., continuance intentions) and social (i.e., quality of life) outcomes. From these three studies this may indicate that behavioural intention construct is internally connected (see figure 1) with QoL construct in a user's usage behavior mechanism. Among these constructs, this study will focus on these two outcome variable constructs: Behavioural intention to use and QoL.

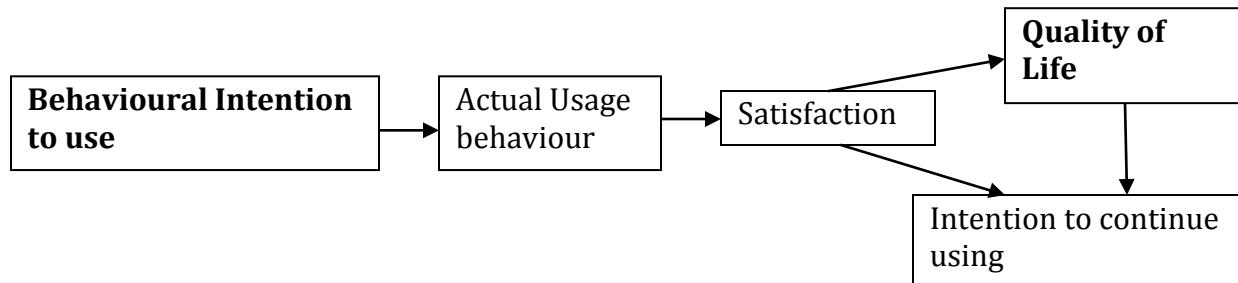


Figure 1. Interconnection between behavioural intention and quality of life (QoL)

The association between QoL and behavioural intention has explored for mobile health services study before (Akhter et al. 2013). They found that a better quality of health life through the mHealth experience will increase patients' further continuous intentions to use this service. Tat et al. (2008) also found behavioural intention have positive impact on

overall student satisfaction through QoL. The extant literature identifies that service evaluation is a context-specific, hierarchical and multidimensional construct (Brady and Cronin 2001; Dabholkar et al. 2000; Fassnacht and Koes 2006; Parasuraman et al. 2005), which has a strong association with economic (e.g., continuance intention) and social (e.g., quality of life) outcomes (Andaleeb 2001, 2008; Choi et al. 2007; Dagger and Sweeney 2006; Dagger et al. 2007). These effects of service quality dynamics can be mediated by affective responses (e.g., evaluation of improvement) and ends with conative effects (e.g., continuance intentions) (Chaudhuri and Holbrook 2001; Dagger et al. 2007). Users' life improvement (QoL) with a service is the primary motivation for usage intentions (e.g. Bhattacherjee et al. 2001). The level of adoption or acceptance indicates their overall financial performance or, economic viability (Bernhardt et al. 2000, Eskildsen et al. 2003). Researchers in both marketing (e.g. Dagger and Sweeney 2006) and information systems (e.g., Choi et al. 2007) report QoL as a critical social outcome variable. Also, Cornwell (2001) suggested exploring the impact of any new technology based service on QoL. QoL concept indicates that people have a variety of needs, and the more they satisfy these needs using mobile information services, the more they feel good about their quality of lives. Here, the study designates QoL as an alternative outcome variable.

The performance of a traditional information system (mobile information services) is usually measured in terms of how effective it is at achieving specific goals and needs (e.g., Gefen et al. (2003)) and how significantly it is using for particular tasks (e.g., Bhattacherjee and Premkumar (2004)). Because of ubiquity, mobile information services may influence users' lives in ways that traditional outcome variables—adoption/acceptance—cannot detect. This study employed not only behavioural intention (Yang, 2005) to investigate the

impact of mobile information (ex. entertainment) services, but also the impact of the services on user's quality of life (QoL). Therefore, this study discusses in detail the evaluation of mobile information services which has a strong association with economic (e.g., adoption) and social (e.g., quality of life) outcomes by a multidimensional constructs' and hierarchical models. This study simplifies the user market mechanism of mobile information services' usage with the effect of economic (adopton) and social (QoL) outcome variables. Definition and measures of the outcome constructs of this study has shown in table 1.

Table 1. Definitions and measures of outcome constructs in this study

Economical, Motivational and Traditional Outcome Variable	Social, Experiential and Critical Outcome Variable
Acceptance or Adoption	Quality of life (QoL)
This study defines acceptance or adoption as how users come to accept and use a technology. When users are presented with a new technology, a number of factors influence their decision about how and when they will use it. Understanding the factors influencing technology adoption helps to predict and manage who adopts, when, and under what conditions. Armed with this information researchers can assess where people are in the adoption process and support them as they move from technology acceptance through to usage.	This study defines QoL as a sense of overall well-being of users by using any information system. Commonly used terms are QoL, standards of living, human well-being, and welfare. QoL is a measure of how happy people or how fulfilled they are in terms of their various wants and needs.
Measures: Behavioural intention, intention to use, nature of use.	Measures: Improvement in overall QoL, Improvement in specific quality of Life domains (work, leisure, educational life, etc.).
Theories: Bhattacherjee (2001); Ajzen (2002).	Theories: Dagger and Sweeney (2006); Choi et al. (2007)

1.4 Importance of the Study

The mobile service market is growing rapidly on generating innovation and creating an emerging market. M-businesses offer more efficient markets and innovative mobile services such as mobile banking, location based services, health, energy, automotive, manufacturing, logistics services, data storage services, voice assistants, messaging, task and calendar management, mobile money, gaming, music downloads, video- conferencing, mobile-TV, Social Networking, etc. Most of these services are related with the 3G/4G device generation. Mobile services engages a user at multiple and diverse purpose. It is, in other words, ubiquitous. However, there are also many new innovative service providers competing for customers, so it is very important to understand user usage behavior and how they fulfill the needs in user's lives. New innovative services people will not adopt quickly. In general, users who adopt mobile services for personal non-work or work purposes incur both data transmission charges and charges for using the service, which may limit mobile services usage and affect motivation to use them. Users may adopt mobile services to fulfill their everyday life needs across distinct aspects of their life including work, home, and leisure (Dholakia et al. 2004; Knutsen et al. 2005; Nysveen et al. 2005a; Nysveen et al. 2005b). Key factors for the success of mobile services are to investigate how they are influenced and how they behave (i.e., users' behavior), and to uncover what they really expect (i.e., needs, contribution and preferences) (Barnes et al. 2002). Therefore, it is essential to understand the adoption behavior of potential users and their requirements to develop to fulfill their needs in life. Thus, research to find factors of adopting innovative mobile services and how these services are improving user's needs in life, are enormously important.

The adoption of mobile services is related to personal factors such as economic and mental resources, lifestyle, and needs. Pedersen and Ling (2002) said that the adoption of mobile services can be seen as a function of motivational, attitudinal, social and resource-related influences. However, there is a dearth of research that focuses on new measures that address both the traits of behavioural intention specific tasks and fulfillment of the needs of life. As such, this study aims to contribute to this research gap by suggesting and empirically testing some models that formally investigates the relationship between the factors that determine mobile information service usage, needs and behavioural intention m-services. Exploring these issues is crucial as it not only provides a better understanding of the behaviors of mobile users but it can also assist practitioners in better formulating their marketing strategies to better promote their service offerings. Here I will try to do research on adoption of mobile services.

Studies on mobile information service technology need to be measured how useful and easy this technology is in achieving its specific purposes and how satisfactory is the process of conducting tasks using the mobile technology because mobile information services is dedicated for the most part to specific tasks. Mobile information system is usually embedded in the user's life (Tamminen et al. 2004). The ubiquitous mobile information service technology, affects not only specific, well-defined tasks, but also various interrelated facets of everyday life. And the improvement of user's life by fulfilling their needs and wants of using mobile information services does not only predicted by the personal characteristics such as adaptive behaviour levels of user. It is also depend on the maximizing the well-being of their life (Cummins, 1998). In other words, because mobile information service technology in a ubiquitous computing environment are diffuse,

pervasive, and in some sense indistinguishable from life itself, it requires new measures that address both the traits of specific tasks by predict the user usage characteristics such as adaptive behaviour and how effective it is at fulfillment of the needs of life by predict the improvement of their life. Therefore, we need to measure how the mobile service technology has been satisfactory in accomplishing specific tasks and how needs and wants of our life has been improved owing to the mobile technology.

1.5 Study Framework

There are many types of mobile information services such as news, weather, horoscopes, video downloads and mobile TV. These various types of actual information service needs require enormous importance on acceptance/ adoption/ intention model and as well as quality of life model for emerging market of mobile information services because information services via a mobile handset require a unique, dynamic and volatile trait in decision making. For instance, the price of each information service can be paid independently and decision can occur many times as needs for services change. This study will identify the factors those will influence the “acceptance or adoption of mobile information services” as an economic outcome variable by using a traditional information technology acceptance research model (a combined technology acceptance model- theory of planned behavioural model) and also designates “contribution on QoL to fulfill the needs of life” as an social outcome variable for mobile information services by using a QoL research model (bottom-up spillover hierarchy model). Figure 2 is showing the study framework of this thesis:

This thesis is positioned in the consumer behaviour or psychology field, studying mobile information services from the customer's point of view. There are four essential

components of studying mobile information services, that is: 1) the customers who use, 2) the mobile service contents which is provided by 3) mobile contents provider organizations with the help of 4) mobile technology (mobile devices and networks). All of the four components are important for the service use experience in a certain context. Because the focus of this thesis is on mobile information services, it draws upon and contributes mainly to the service marketing and management, consumer behaviour literature and to literature on mobile information services. The service marketing and management and consumer behaviour literature is customer-focused, and many of the theories that analyze customer behaviour stem from consumer psychology or behaviour literature. In the thesis, the behavioural intention framework is based on Kondo and Ishida (2014)'s framework that builds on service marketing and management research also combines aspects discussed in the consumer behaviour field. The QoL study framework is based on Choi et al (2007)'s study framework of mobile user needs and satisfaction that builds on consumer behaviour and social psychology field. In the author's view, much of the theory available in electronic services and especially in mobile services is still very technology-oriented and that consumer behaviour or social psychology theories provide a better user and service oriented background for explaining mobile user needs, attitudes, behavioural intention and quality of their life in terms of mobile service usage. This thesis is focused on the user's behaviour literature and mobile research respectively.

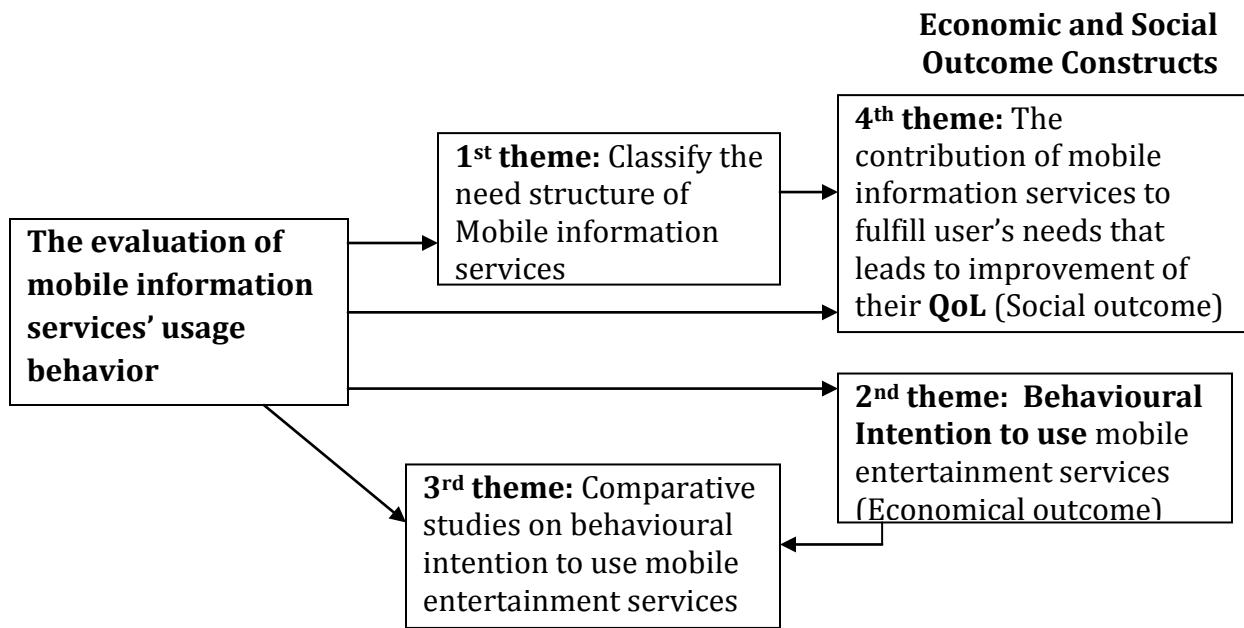


Figure 2. The study framework: concepts employed in the thesis

1.6 Strengths and Uniqueness of the Study

Understanding the contribution of mobile information service usage behavior to economic and social outcomes is fundamental to broadening the focus on mobile user's decision making process. This is important in understanding the role of mobile information services in financial benefits through behavioural intention and in societal welfare through QoL. Firstly, this study is a direct contribution to theory as it examines the factors that influence 'behavioural intention' in the context of mobile information services. Secondly, conceptualization and evaluation of QoL are significant because QoL is not well understood as an outcome of mobile information services despite a growing focus on the relationship and the impact of service systems research on society (Alter 2010; Ostrom et al. 2010). It is apparent that business to customer (B2C) service providers, such as mobile information services, need to move beyond traditional financial measures and embrace the social outcomes of service systems. These associations are important as the global economy is

becoming characterized by services with more than a 70% contribution in GDP (Ostrom et al. 2010). In this service growth, technology-mediated service providers increasingly find themselves in a world of service systems in which they evaluate their performance on both financial and social outcomes.

The study thus address Ostrom et al.'s (2010) concerns, that is, "service is not only about increasing revenues and profits at for-profit firms but also about how to advance service in a way that delivers higher-order, societal outcomes". Since service systems research is a new area, scholars still strive to frame its impact on critical financial and social outcomes. The uniqueness of this study lies on the fact that this study develops comprehensive models that integrate the impact of mobile information service usage behaviour on both financial or economical and societal outcome variables. Not one service alone can sustain a healthy profit by itself. Hence, the focus of mobile company will not to be on one service but the company's service line. So, the uniqueness of this study is that its deals with multiple information services provided by a mobile service provider instead of one service.

Other uniqueness is that the investigation for the intention behavior of mobile entertainment services is growing but limited in developing economy context, i.e. from Bangladesh's perspective. Most of the mobile entertainment technology acceptance researches have established based on the data from developed country contexts. There are few studies in information system which has designed models to serve developing countries (Walsham et al. 2007). It is worth noting that developing countries represent more than four billion consumers and the concept of designing economically-viable and socially-responsible information communication technology (ICT) platforms to serve this majority of the world's population has gained increased attention (London et al. 2009; Prahalad, 2004). Therefore, in

focusing on an innovative information technology artifact (mobile entertainment), the applicability of behavior intention model by obtaining data from a developing economy, i.e. Bangladesh is worth investigating. Most of the researches were about the usage of task-oriented mobile services in Bangladesh. There was no study on the entertainment oriented mobile services for Bangladesh. The usage behavior for mobile entertainment services will be different from the task-oriented mobile services (Hsu and Lu, 2004). This study is the first attempt to examine the usage behavior of mobile entertainment services in Bangladesh context.

This study will try to find out the homogeneous behavior between two different countries in terms of intention to use mobile entertainment services after adjusting time difference when both these countries were same adoption stage of smartphone and 3G services (Japan 2009 and Bangladesh 2014). This study may provide evidence for the existence of a “world youth segment” in Japan 2009 and Bangladesh 2014 after adjusting time and technology differences. It may be possible to assume that a somewhat homogeneous youth segment exists across borders. Such a segment seeks innovative technology that provides enjoyable and efficient pastimes, in which young consumers perceive a series of factors as important determinants in using mobile entertainment services.

And this study will try to find out the differences in user's intention behavior mechanism to use mobile entertainment services in the same country but different time periods (Japan 2009 and Japan 2014). The influence of some factors may change as users experience with the technology changes over the course of a service system's lifecycle. Mobile entertainment services such as gaming services are characterized as experiential services

(Nysveen et al. 2005). The model of intention to use mobile entertainment services may vary across different life cycle stages (introduction and growth stages) of smartphone and 3G/4G services. This study makes an important contribution to the consumer behavior literature, because it is one of the first attempts to explain mobile entertainment services adoption in a cross-temporal context for the same country and expecting to get some differences in adoption. To get homogenous user's behavior mechanism in different countries context and get different user's behavior mechanism in a same country but different service life cycle stages will add strength for this study.

Since this study is expecting to get that user's will have needs on information-intensive, entertainment and communication mobile service categories in a global scales. It will add strength of this study to know how these services is fulfilling the needs of their life by QoL research. This study is also expecting that the life dimensions related with information-intensive, entertainment and communication mobile service categories will have contribution on user's QoL also. There are lots of QoL researches on economic, social, behavioural and health-care perspectives. But there is few QoL research on behavioural science of mobile information service dimension with current usage knowledge. This study is the first attempt to examine the contribution of mobile information services to improve the quality of user's life with current usage knowledge. This will add strength and uniqueness for this study.

1.7 Research Aims and Objectives

The aim of this research is to construct a method to better understand the patterns of user adoption and intention behavior regarding mobile devices. In order to do researches explained in the above, I construct adoption model and QoL theory as follows: a modified

technology acceptance model-theory of planned behavior (TAM-TPB) and bottom-up spillover theory. Details of these models are explained in each relevant section, respectively. Further, clear understanding of the mobile service needs of users can be achieved by investigating the need structure of mobile services across countries.

One of our objectives is to achieve a clear understanding of user behavior and attitude towards mobile information services; I have investigated the antecedents related to their adoption and usage. I aim to generate a research model that accurately describes youths' mobile information services usage behavior and belief structure. Here I examine whether there are differences within the antecedents of "behavioural intention" when the services used differ, focusing on multiple mobile services.

This other research objective is to focus on students' acceptance and behavior of mobile information (Ex. Entertainment) services. I believe that studying the acceptance of mobile information (Ex. Entertainment) services at a university level is important as youth are innovators of using mobile services that require skills for dealing highly innovative IT devices, which provides insights to develop mobile information services.

Another objective of this thesis is to understand how much MIS affects young's life. The objective of this study is to build on the research focusing on the factors between improvement with mobile information services and individual life improvement and life improvement overall. Doing so should assist mobile market planners in appreciating the importance of the behavioral phenomenon of improvement with mobile information services for service and device development effort. The overview of the whole idea of these study topics has presented in table 2. The objectives are summarized as follows:

1. Identify the mobile information services need structures in terms of behavioural intention to use these services;
2. Identify the factors those influence the behavioural intention to use mobile information (Ex. entertainment) services by examining a technology adoption model;
3. To find out the differences in behavioural intentions to use mobile information (Ex. entertainment) services among countries;
4. To understand how mobile information services contribute to fulfill user's needs of life.

Table 2. The overview of the whole idea of the study topics

Mobile Services Category	Analysis	Method/ model	Subject	Country
Information Services	Classification of mobile services	Factor Analysis	a) National b) Students	a) Two years of Japan, b) Japan and USA
Entertainment Services	Individual study on behavioural intention	TAM-TPB model	Students	Bangladesh
Entertainment Services	Comparative study on behavioural intention	TAM-TPB model	Students	Japan and Bangladesh
Information Services	Contribution in quality of life	Bottom-up spill over theory	Students	Japan

1.8 Interconnection among the Objectives

The First study objective or theme is the identification of need structures of several mobile information services. In order to learn about how users perceived the needs with respect to mobile information services, this study will classify the categories of mobile information service's needs. In order to find out an appropriate category of information services with high penetration rate for satisfaction-loyalty model, Kondo et al. (2010) conducted three factors (information-intensive factor; amusement factor; low penetration

factor) on the 21 mobile information services for Japan 2008. Among all the factors, the amusement dimension has higher user ratio in their study. ‘Amusement factor’ appears to contain the dimensions of “entertainment” (e.g., games, music, ringtone, etc.) and “communication” (e.g., various kinds of E-mails, SMS, MMS, etc.). The result from their study showed that measurement variables of amusement services that have higher amusement characteristics have stronger relationship with the latent variables (use motivation, etc.) than the ones with lower amusement characteristics. For instance, their result showed that there is a significant impact of amusement on use motivation. Thus, in my first study I also expecting to get the result that user will have the needs on entertainment service aspect for Japan 2009 and USA 2009. The findings of the first study will also show that mobile user in Japan 2008 and Japan 2009 has the needs on mobile entertainment service category with second highest penetration rate after the needs of communication service category. Since, communication service category is the basic task-oriented services and there have many researches on communication task oriented services but there is a rare research on entertainment oriented service category especially for a developing country context (ex. Bangladesh).

As, the first study expecting to get the result on needs of entertainment service category for Japan 2009 and USA 2009, the second study theme has chosen to identify the factors those influence behavioural intention to use mobile entertainment services in Bangladesh 2014. Kondo and Ishida (2014) recently introduced a TAM-TPB model for cross-national (Japan vs. the USA) analyses of the intention to use multiple mobile entertainment services (MES) for Japan 2009 and USA 2009. They utilized the model for mobile entertainment services in the US and Japan based on a 2009 data set of young users. Adoption was still in

the early stage before the expansion of mobile entertainment services begun with the introduction of the iPhone 4 in 2010. I consider that Bangladesh in 2014 is at the same introduction stage for the adoption of smartphones and 3G services for entertainment that Japan and the US were at in 2009. Therefore, I conducted the second study in the context of a developing country, Bangladesh, by using the TAM-TPB model of Kondo and Ishida (2014) as a basis to confirm their reasoning.

The third study assumes that User's intention behavior mechanism to use mobile information services can be homogenous between the countries (Japan 2009 and Bangladesh 2014) and assumed to be different between during time (Japan 2009 and Japan 2014). Kondo and Ishida (2014) have primarily taken a static view of the influence of variables such as those in TAM-TPB on mobile entertainment usage; they have not considered how the influence of those factors may change as users experience with the technology changes over the course of a service system's lifecycle. The model of intention to use mobile entertainment service may vary across different life cycle stages (introduction and growth stages) of smartphone and 3G/4G services. Different variables within the model may have different influences on intention depending on experience of smartphone and 3G/4G service usages. Therefore, the third study conducts comparative studies on behavioural intention of mobile entertainment services to find out the similarities and differences in usage.

Since, the first study will conduct to identify the needs dimensions of mobile information services usage in Japan and expecting to have the needs of information-intensive, entertainment, communication services categories. The fourth study theme has chosen to know how the user needs in life are achieving in different life aspects by using these mobile

information services. First study will try to identify the needs of mobile information service dimensions, the fourth study will investigate how mobile information services are contributing to improve the needs of user's life, in short, QoL for Japan 2013 with the current usage knowledge. As long as a mobile company serves its users' well it is profitable in the long run. Hence, the focus of mobile company will not be on one service but the company's service line. This is because not every service can sustain a healthy profit by itself. Some services act to complement others. Therefore, it is needed to know which mobile services are serving users' well by fulfilling their needs with improvement of their QoL to make long-term profit for the mobile company.

Mobile information services (MIS) is an Internet based advanced information services that has the potential to increase customer usage intention, quality of user's life as well as the performance of the mobile company and is thus worthy of further research efforts. The results of this study can suggest some crucially key factors. These key factors then could be manipulated in a way they influence usage behaviour of current and potential users of mobile information services. In this way, they can achieve an efficient and effective use of mobile information services.

1.9 Importance of the Objectives (themes)

Previous section describes the connection among the four interrelated study objectives or themes, this section will describe the importance to study them in respect to mobile information services.

1.9.1 (1st Objective): Classify the Need structure of Mobile Information Services in Japan and USA

As mobile carriers and content providers perform on a global scale [10], empirical cross-

national research on mobile services has become increasingly relevant. A clear understanding of the mobile service needs of users can be achieved by investigating the structure of mobile services across different countries. If there are differences in service needs structures between two countries, mobile companies need to vary their international marketing strategies and tactics between the countries by adjusting for the differences. For finding which strategy to take, I should make a comparison between needs of different countries with respect to mobile information services, whether users in different countries perceive these needs differently.

1.9.2 (2nd Objective): Behavioural Intention to Use Mobile Entertainment Services among Bangladeshi Student

The mobile information service (Ex. entertainment) market is generally characterized by great uncertainty regarding user demand. Despite growing enthusiasm and hopes for growth, adopters of mobile information (Ex. entertainment) services continue to comprise a negligible segment of mobile subscribers overall, and profitability currently poses an important challenge in this market (Ankeny, 2009; Dredge, 2009). Therefore, in mobile information (Ex. Entertainment) service business, (1) understanding what compelled the customers to adopt and intend to use the service when they are presented in an emerging mobile market and (2) making customers use repeatedly to the service is crucial to increasing business value. In mobile information (entertainment) service business, making customers return to the service repeatedly is important to increase the value of business. Predictions of increasing revenue from mobile entertainment services in the future depend ultimately on the factors influencing the adoption decision. It becomes important for the service providers to develop appropriate service strategy for both potential adopters and

current adopters. Most past studies have focused on adoption of task-oriented technology in a developing country (ex. Bangladesh) context. Adoption of entertainment-oriented technology such as game, music and ringtone has hardly been addressed. As indicated in the study by Hsu et al. (2004), the factors influencing the adoption of entertainment-oriented technology are different from the factors influencing the adoption of task-oriented technology. This provides a need for undertaking this study. Also researches on mobile entertainment services in developing country context (Ex. Bangladesh) are still in infancy age. A key to my understanding of mobile entertainment services adoption is the identification of the factors relating to their decision about how and when they will use mobile entertainment services.

1.9.3 (3rd Objective): Behavioural Intention to Use Mobile Entertainment Services among Young Users in Japan and Bangladesh: Comparative Cross-country and Cross-temporal Studies

As the use of mobile devices and Internet has spread globally, mobile technology and m-commerce usage patterns vary across different cultures. Cross-cultural issues are highly related to mobile commerce adoption. However, little research has been conducted on cross-cultural issues in the mobile entertainment environment. This might be due to the difficulties in conducting culture research (Straub et al. 2002). Very few prior studies focus on the antecedents of user acceptance and their intentions to use mobile entertainment services in a cross-cultural context. This study also does a comparative analysis between the antecedents of user acceptance and their intentions to use mobile entertainment services for cross country and cross-temporal studies.

1.9.4 (4th Objective): The Contribution of Mobile Information Services to Fulfill User's Needs by Improving their Quality of Life in Japan

Quality of life as “the extent to which objective human needs are fulfilled in relation to personal or group perceptions of subjective well-being” (Costanza, 2008). While objective needs refer to intention, motivation, readiness, repeated to use and etc., subjective perception aims at overall contribution which includes the aspects of ideal; improvement; satisfaction and achievement. Some researchers have shown that QoL may have a significant impact on user behavioral responses (Meadow and Sirgy, 1991). We may assume that quality of user's life may also have significant impact on user's behavioral responses such as behavioural intention. If users are overall satisfied in their life after using mobile information services that mean mobile information services are improving their life and they will be more intend or reused these services. To understand usage intention of mobile information services, we also need to understand the contribution of mobile information services to improve the quality of user's life. A new philosophy to mobile information service marketing is providing by the QoL movement. Mobile information service marketing researchers are encouraged to do research to help discover those services that do not simply make happy customers but also make *happy people in general*. Hence, the crux of the QoL movement is to help establish the strong connections between certain mobile information services that significantly contribute to life improvement of a certain user group, over the long haul. The QoL concept as a mobile information service marketing philosophy is unique in the sense that satisfying customers is not good enough; marketing professionals need to do more. They need to help make people happy in general. Whatever mobile market professional do, they need to find out the

extent of contribution of their service to life improvement of their target user. Finding out the extent of contribution of mobile information services on life improvement places in a position to strengthen the extent of positive contribution and minimize the extent of negative influence.

In this circumstance, this study is needed to find out the contribution of mobile information services to quality of life (QoL). As example, a recent study found that healthcare services improvement seems to play a significant and important role in elderly's life improvement (Sirgy et al. 1991). That is, if elderly are dissatisfied with healthcare services, they feel unhappy too about themselves and life at large. A very few studies have developed to analyze the relationship between mobile information services and quality of life (QoL). Choi et al. (2007) described the contribution of mobile services in user's individual lives to improve the quality of their overall life for Korea and Japan in 2006 (or before). At present we have little sense of how much mobile information services affects user's quality of life with the current knowledge of 3G/4G mobile information services adoption. So, here I have tried a mobile information service marketing research that will tell that what significant role mobile information services play in enhancing or debilitating the user QoL in a technology advanced country (Ex. Japan) and discover specific aspects (work, safety, leisure, etc.) of mobile information services that significantly contribute to life improvement.

1.10 Contexts of the Themes

The use of mobile services is increasing rapidly both in technologically developed and developing places. The number of mobile subscriptions of examined countries in this study is in table 3 (Informa, 2014; international telecoms regulators):

Table 3. The number of mobile subscriptions of examined countries in this study

Country	Rank	Mobile subscriptions in millions	% of population	update
World		6,587.4m	95.5%	06/2014
United States	3	345.2m	110.0%	06/2013
Japan	7	137.9m	108.0%	02/2014
Bangladesh	12	116.0m	80.5%	09/2014

1.10.1 (1st Theme): Classify the Need structure of Mobile Information Services in Japan and the United States

In order to learn about user needs with respect to mobile information services, and whether users in different countries perceive these needs differently, we performed a comparison between the mobile information services needs structure of young people in Japan and the United States. These locations were selected for this international comparison because they are the two leading countries in the mobile market and because they use mobile services differently. Mobile users in Japan are the —most connected, with more than 75% using connected media (browsed the Internet, accessed applications, or downloaded content) compared to 43.7% in the United States [13]. At the end of June 2010, there were 111 million mobile subscribers in Japan [11], and there were 302.95 million subscribers in the United States at the end of December 2010 [12]. There is a need to identify a practical systematic framework of different structures in mobile information service needs in the United States and Japan by way of a cross-national comparison.

1.10.2 (2nd Theme): Behavioural Intention to Use Mobile Entertainment Services among Bangladeshi Student

In recent years, the uses of mobile phones have witnessed tremendous growth in Bangladesh. The country is the ninth-largest market worldwide in terms of mobile subscribers in

2013 with 116 million mobile subscribers. The mobile subscription penetration rate is 75 % in total population. Bangladesh is a 2G mobile market with 98% connections. To download game application and music, the smartphone with mobile web or 3G connections are needed. According to India based Counterpont Technology Market Research, in the last quarter of 2014, the market for smartphones saw an increase of over 83% year-on-year. Perhaps, the penetration of 3G (2% in 2013) and smartphone (6% in 2013) is low due to the late release and short time period for availability. There are 22.3% are mobile web subscribers (BTRC, 2013). The number of smartphones, 3G and mobile web subscribers are increasing with time. The use gaming applications is a desired service for 3G young subscribers (Mahfuj et al. 2013). This can surmise that Bangladesh has potentiality for advanced mobile entertainment business in future. Therefore, at early stage of introduction any new mobile entertainment technology with 3G connection or mobile web, the adoption model on mobile entertainment services is needed.

1.10.3 (3rd Theme): Behavioural Intention to Use Mobile Entertainment Services among Young Users in Japan and Bangladesh: Comparative Cross-country and Cross-temporal Studies

There are 14 countries in the world with over 100 million mobile subscriptions; among them Japan is ranging seven and Bangladesh is ranging twelve. In Japan, there were 111 million mobile subscribers, 92.5 million of them use mobile data services – that's 83 percent of the subscriber base, or 72 percent of the population (Telecommunications Carriers Association Japan, 2010). There are about 69 million mobile Internet users, which equals 62 percent of mobile subscribers in total. According to ComScore's excellent 2010 Mobile Year in Review (February 2011), 16.3 percent of Japanese customers are playing games and 12.9 percent are listening music via mobile.

Bangladesh is predominantly a prepaid and 2G markets, as 3G has only recently been deployed following delays in the auction process (3G today makes up just 2% of connections). However, mobile internet penetration is over 20%, mostly from 2G feature phones. In other words, there is a potential desire for internet access that is growing. Mobile operators in Bangladesh are concentrated in the entertainment category. Mobile value added services in Bangladesh have categorized in two categories: Entertainment and development services. Among them, general entertainment services (news, religion, games, music, etc.) are mostly used services.

Very few prior studies focus on the antecedents of user acceptance and their intentions to use mobile entertainment services in a cross-cultural context. In a global business environment, researchers and practitioners need to develop deeper understanding of the impact of user characteristics and their behavior on the acceptance of mobile entertainment services in different cultures. This study also tries to find out the differences in behavioural intentions of mobile information (Ex. entertainment) services among Bangladesh and Japan.

1.10.4 (4th Theme): The Contribution of Mobile Information Services to Fulfill User's Needs by Improving their Quality of Life in Japan

Japan has developed a sophisticated mobile phone market. The Japanese mobile service market is years ahead than other existing market and is leading the way with respect to the mobile phone culture. . In Japan, there were 111 million mobile subscribers, 92.5 million of them use mobile data services – that's 83 percent of the subscriber base, or 72 percent of the population (Telecommunications Carriers Association Japan, 2010). There are about 69 million mobile Internet users, which equals 62 percent of mobile subscribers in total. The

smart phone market in Japan expanded in 2010 with innovative and diverse formats such as personal/governmental/corporate communications. In Oct 2013, 85.3% of total population in Japan was 3G/4G subscribers. Mobile service sales in Japan have been user driven: people use their phones for e-mail, music downloads, games, and mobile-wallet services, in which financial transactions are carried out via the mobile phone. There are also very few studies on how young's quality of life has been improved owing to the mobile technology in Japan. Therefore, this study also examines the contribution of life domains to young's "QoL" after using mobile information services for Japan which has an expanding mobile market.

1.11 Research Models

1.11.1 The Combined Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB)

This study propose an approach to assess the potential adoption of mobile entertainment services through based on the technology acceptance model (TAM) and the theory of planned behavior (TPB) in Bangladesh. Though the TAM-TPB model has been used to analyze the adoption of mobile services, the focus of these studies differs from the one proposed in this study. In the past, research emphasis has been on the most frequently used mobile service. For example, Quan, Hao, and Jianxin (2010) researched a category of mobile "transaction" services in China using a TAM-TPB approach. They found that a combined TAM-TPB model is suitable for evaluating the potential behavioural intention specific mobile commerce services. Okazaki, Skapa, and Grande (2008) researched mobile games by applying TAM in Japan, Spain, and the Czech Republic. Nysveen, Pedersen, Thorbjørnsen, and Berthon (2005) developed and tested a modified TAM-TPB by

triangulating theories of information systems (IS) research, uses and gratification research, and domestication research in order to explain users' "behavioural intention" four types of mobile services. Kondo and Ishida (2014) has examined the "behavioural intention" most frequent used mobile entertainment services (game, music, ringtone) for Japan and USA by using TAM-TPB model. This study examines the antecedents of "behavioural intention" focusing on multiple mobile entertainment services in the context of a developing country, i.e., Bangladesh where mobile entertainment market is presently emerging.

Most multiattribute behavioural intention models use the same logic bottom-up spillover hierarchy model in predicting and explaining attitude and behavioural intention. For example, most marketing researchers are familiar with brand behavioural intention and attitude formulations, such as Fishbein's behavioural intention model (Fishbein and Ajzen, 1975). Such as, a user's attitude and behavioural intention to use mobile services, such as game, music and ringtone, is a direct function of the user's evaluations of the fore, intrinsic improvement was not included as an independent various attributes of the usage (moderated by the belief strength associated with each attribute). Improvement researchers used the same logic to conceptualize the user improvement (Aiello, Czepiel, and Rosenberg, 1977). Evaluation of each attribute is viewed as improvement, and overall life improvement is conceptualized to be determined with each life domain (job, family, personal health, leisure, and so forth).

1.11.2 Bottom-up Spillover Hierarchy Model

This study uses the hierarchy model to explain the relationships that exist between mobile information services improvement and QOL (Meadow, 1988). The model is suggested by research in user improvement (Aiello, Czepiel, and Rosenberg, 1977) and life

improvement (Andrews and Withey, 1976; Campnations, bell, Converse, and Rodgers, 1976). The basic premise is that life improvement is functionally related to improvement with all of life's domains. Figure 1 shows that life improvement is influenced by lower levels of life concerns. This argument is by Andrews and Withey (1976), who maintain that improvement occurs at various levels of specificity. Specifically, life improvement is influenced by evaluations of individual life domains. The greater improvement of life domains as health, work, family, and leisure, etc. will create the greater improvement with life in general. The hierarchy model "postulates that overall life improvement is determined by improvement with major life domains. The affect within a life domain spills over vertically superordinate domain (life in general), thus determining life improvement" (Neal et al. 1995).

1.12 Research Methods

The data sets for this study were collected using questionnaire surveys. The survey approach is considered most appropriate technique, especially in technology acceptance and mobile information services research, because this technique is faster, inexpensive, efficient, and can be administered to a relatively large sample (Churchill, 1995, Sekaran, 2000; Zikmund, 2003). Structural equation modeling was used to validate the mobile information services adoption models. Structural Equation Model (SEM) was selected since it is superior to other methods such as multi-level regressions. SEM has a collection of statistical techniques that allows a set of relationships between multiple dependent variables and multiple independent variables to be investigated simultaneously (Gefen et al. 2011). Structural equation model (SEM) was used to analyze relationship between measured and latent variables as well as estimating and testing a theoretical relationship

between variables affecting the behavioral behavioural intention mobile information services and their contribution in needs of life. The brief description on structural equation modeling is on appendix 2.

To understand the behavioural intention to use mobile information (ex. Entertainment) services by a modified TAM-TPB model, this study has used Covariance Structure Analysis. Because TAM-TPB model is well developed and matured and has theoretical information on before. A Covariance Structure Analysis need a lot more sample size. This study sample size is more than 200, so Covariance Structure Analysis can be used. Covariance structure analysis will also help this study to Testing, verifying and confirmation of the modified TAM-TPB model because it has global fit indices. So, covariance structure analysis is suitable for TAM-TPB model.

To understand how mobile information services contribute to improve the quality of life by using bottom-up spillover hierarchy model, this study used Partial least square structure analysis. This model is not matured enough with lots of theoretical information in case of mobile information services, so use this analysis method is appropriate. Also this study sample size is less than 200, partial least square structure analysis can handle small sample sizes. This study has 15 latent variables, Partial least square structure analysis can handle complex model with lots of latent variables. This study has both formative and reflective measurements, partial least square structure can analyze formative measurements whereas covariance structure analyze only reflective measurements. So, Partial least square structure analysis is suitable for bottom-up spillover hierarchy model.

1.13 Structure of the Thesis

This section briefly explains the structure of this thesis. Chapter one introduces the issues related to the topic under investigation of mobile information services usage behaviour. Chapter two discusses in detail various theories such as the theory of reasoned action (TRA), theory of planned behavior (TPB), the technology acceptance model (TAM), the technology acceptance model (TAM) - theory of planned behavior (TPB) models and bottom-up spillover hierarchy model and the research gaps. Drawing on the literature review and gaps presented in Chapter two, Chapter three presents the theoretical framework and hypotheses for this thesis. The chapter four provides an overview of the research methodology in terms of data collection and instrument development techniques. The chapters five presents the data analysis, results and the findings from the studies. Finally, it presents overall discussion, implication, weakness, future research directions and conclusion of the acceptance and contribution of mobile information services.

Chapter Two

Literature Review

2.1 Overview

Emerging information technology cannot deliver improved organizational effectiveness if it is not accepted by potential users and is not improve the quality of user life. Here I am going to introduce the models that related to this thesis. Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), Theory of Reasoned Action (TRA), TAM-TPB and bottom-up spillover hierarchy models are the most successful and effective models for measurements of digital device based usage among practitioners and academics.

Contexts

2.2 Cross-country Studies on Mobile Information Services

The explosive growth in the use of mobile services is frequently noted in research studies (Barnes and Scornavacca, 2004; Massoud and Gupta, 2003). Harries et al. (2005) investigated the role that culture plays in explaining differences in adoption, usage, and attitudes with regard to mobile services by comparing the United Kingdom and Hong Kong. Cho [6] explored how mobile phone users in the United States and Korea adopt both existing and potential mobile services. Lee et al. (2006) investigated the different usage patterns among mobile users in Korea and Japan and interpreted these patterns within the framework of a value structure. Vrechopoulos et al. (2003) conducted sociological research and found Finland to be the most mature mobile market when compared with Germany and Greece. They identified critical success factors and noted that these factors vary among the countries. Bohlin (2003), on the other hand, identified new policy implications for the

future European mobile market through an analysis of the success factors in the Japanese mobile Internet market.

2.2.1 Research Gap on Cross-Country Studies for Mobile Information Services' need analysis (1st Theme)

Despite the growing importance of mobile devices, few studies have been conducted using a cross-national approach. The usages of mobile devices vary considerably among different countries [4]. The adoption of mobile services and technology does not appear to follow any single universal logic or pattern for different countries [2]. As mobile carriers and content providers perform on a global scale (Haghrian and Madlberger, 2005), empirical cross-national research on mobile services has become increasingly relevant. A clear understanding of the mobile service needs of users can be achieved by investigating the structure of mobile services across different countries. There has a research gap about user needs with respect to mobile information services, and whether users in different countries perceive these needs differently.

2.3 Behavioral Intention Theory

2.3.1 Theory of Reasoned Action (TRA)

This theory, developed by Fishbein and Ajzen (1975), is one of the most important theories used to explain rational human behaviors. The components of TRA are three general constructs: behavioral intention (BI), attitude (A), and subjective norm (SN). TRA suggests that a person's behavioral intention depends on the person's attitude about the behavior and subjective norms ($BI = A + SN$). If a person intends to do a behavior then there is a high possibility that the person will do it.

Behavioral intention measures a person's relative strength of intention to perform a behavior. Attitude consists of beliefs about the consequences of performing the behavior multiplied by his or her evaluation of these consequences (Fishbein and Ajzen, 1975). Subjective norm is seen as a combination of perceived expectations from relevant individuals or groups along with intentions to comply with these expectations. In other words, "the person's perception that most people who are important to him or her think he should or should not perform the behavior in question" (Fishbein and Ajzen, 1975).

To put the definition into simple terms: a person's volitional (voluntary) behavior is predicted by his attitude toward that behavior and how he thinks other people would view him if he performed the behavior. A person's attitude, combined with subjective norms, forms his behavioral intention (see figure 3).

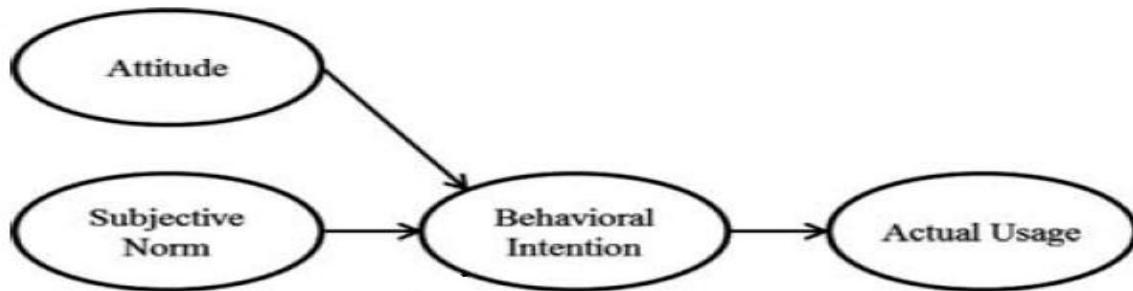


Figure 3. Theory of Reasoned Action (TRA)

2.3.2 Technology Acceptance Model (TAM)

TAM explains users' behavioural intention technology. TAM provides a basis for discovering the impact of external variables on internal perceptions (beliefs), attitudes, and intentions. TAM was adapted from the TRA to technology and explains human behavior based on reason. The original TRA includes the following factors: Beliefs, attitude toward use, subjective norms, and behavioural intention (Fishbein and Ajzen, 1975). Davis (1989)

did not consider subjective norm in predicting behavior because Fishbein and Ajzen admitted that subjective norm was the least understood concept of TRA and had an uncertain theoretical status. Second, instead of considering several individual salient beliefs, he focused only on two: Perceived usefulness and perceived ease of use. Perceived usefulness is defined as the “the degree to which a person believes that using a particular system would enhance his or her job performance.” Perceived ease of use is defined as the “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1989). Usage intention is measured through self-predicted future usage, and “actual usage” is measured through self-reported current usage. Figure 4 shows the path diagram for TAM.

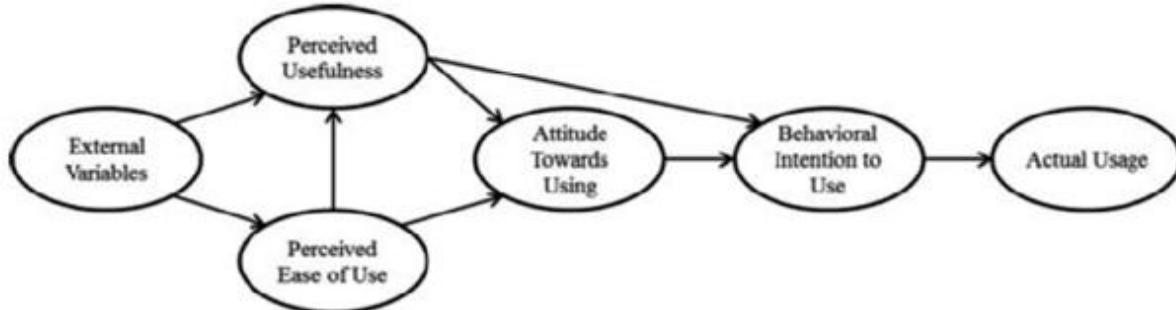


Figure 4. Technology Acceptance Model (TAM)

2.3.3 Theory of Planned Behavior (TPB)

Ajzen (1991) developed the theory of reasoned action by adding the construct ‘perceived behavioral control’ into the model as a determinant of behavioral intention and behavior. It determines the impact of three factors, which are ‘attitude’, ‘subjective norms’, and ‘perceived behavior control’ on the tendency to behave in a certain fashion (Taylor and Todd, 1995). Perceived behavioural control is defined as one’s perception of the difficulty

of performing a behavior (Taylor and Todd, 1995). The TPB (see figure 5) views that the people have control over their own behavior lies on a continuum from behaviors that are easily performed to those requiring considerable effort and resources.

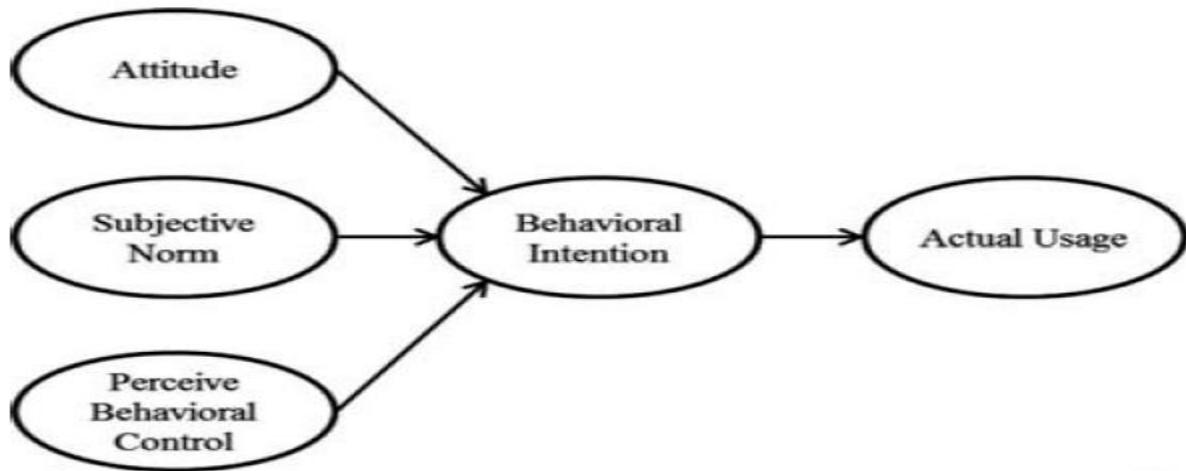


Figure 5. Theory of Planned Behavior (TPB)

2.3.4 The TAM-TPB Model (Kondo and Ishida, 2014) for Multiple Mobile Entertainment Services

TAM-TPB model by Kondo and Ishida (2014) follows the direction suggested by Chittur (2009). Chittur (2009) suggested developing new models that would exploit the strength of TAM while discarding its weakness by citing the results of the comparison of TAM with TPB by Mathieson (1991). For predicting the intention of using spreadsheet application, Mathieson found that the both models were suitable. TPB being more complex has several independent variables that capture various aspects of an individual belief, so that TPB provided more details that explained the behavioural intention the application. The literature in general supports the use of TAM and TPB as well as their combination. As example, Nysveen et al. (2005) researched four mobile services in Norway using a TAM-TPB approach. In, TAM-TPB, Behavioral intention is an indication of an individual's

readiness to perform a given behavior. It is based on attitude toward the behavior, subjective norm, and perceived behavioral control, with each predictor weighted for its importance in relation to the behavior. Attitude toward behavior is an individual's positive or negative evaluation of self-performance of the particular behavior. The concept is the degree to which performance of the behavior is positively or negatively valued. Subjective norm is an individual's perception about the particular behavior, which is influenced by the judgment of significant others (e.g., parents, spouse, friends, teachers). Perceived behavioral control is an individual's perceived ease or difficulty of performing the particular behavior. It is assumed that perceived behavioral control is determined by the total set of accessible control beliefs. The concept of perceived behavioral control is conceptually related to self-efficacy. Kondo and Ishida (2014) 's TAM-TPB (see figure 6) is developed by using the effects of motivational influences, attitudinal influences, normative pressure, and perceived control on users' intentions to use mobile services. Therefore, I will observe whether perceived behavioral control, attitude and subjective norm have any influence on behavioural intention mobile entertainment services. Their hypothesized that: attitude positively influences behavioral intention of overall entertainment services, subjective norm positively influences behavioral intention of overall entertainment services, perceived behavioral control positively influences behavioral intention of overall entertainment services and perceived behavioral control positively influences attitude.

In order to form a behavioral intention, customers concern to know what kind of benefit or values them can obtain from the services, this is perceived value. Perceived value defines as "the user's overall assessment of the usefulness of a product/service based on perceptions on what is received and what is given (Heinonen, 2004). Perceived value have

positive association with decision making which has also indicated by (Zeithaml, 1988). Kondo and Ishida (2014) proposed to use the concept of perceived value. Kondo and Ishida (2014)'s modified TAM-TPB differs from the original TAM in "perceived value for a given price" rather than "perceived usefulness." TAM explains users' behavioural intention technology. Therefore, this study will observe whether perceived value has any influence on behavioural intention mobile entertainment services. I postulate that: Perceived behavioral control positively influences perceived value, perceived value positively influences attitude and perceived value positively influences behavioral intention of overall entertainment services.

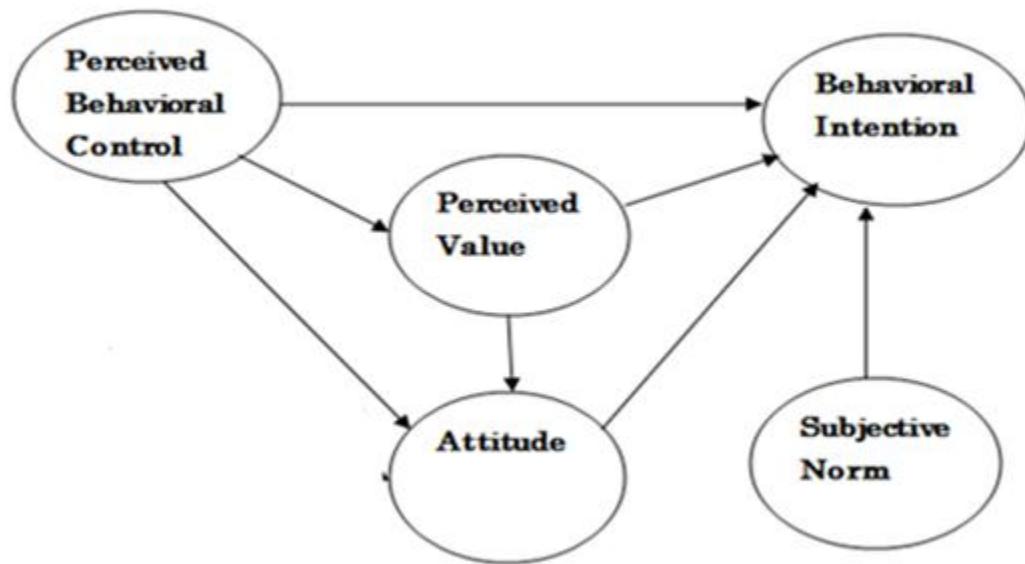


Figure 6. The Combined TAM-TPB Model (Kondo and Ishida, 2014)

2.3.5 Research Gap on Behavioral Intention to Use Mobile Entertainment Services (2nd Theme)

The overall literature clearly indicates that there is no theoretical model that can reliably

and validly measure the intention to use mobile entertainment services in developing countries. Kondo and Ishida (2014) recently introduced a TAM-TPB model for cross-national (Japan vs. the US) analyses of the intention to use multiple mobile entertainment services (MES). They utilized the model for mobile entertainment services in the US and Japan based on a 2009 data set of young users. Adoption was still in the early stage before the expansion of mobile entertainment services began with the introduction of the iPhone 4 in 2010. This study considers that Bangladesh in 2014 is at the same introduction stage for the adoption of smartphones and 3G services for entertainment that Japan was in 2009. Therefore, this study conducted in the context of a developing country, Bangladesh, by using the TAM-TPB model of Kondo and Ishida (2014) as a basis to confirm their reasoning. However, user attitude can be mediated by the effects of two value antecedents: fun (hedonic) and usefulness (utilitarian, Bruner and Kumar, 2005 and Okazaki et al. 2008). This study also tries to extend the model by adding the concept of hedonic and utilitarian value in the TAM-TPB model.

2.3.6 Research Gap on Comparative Studies for Behavioral Intention to Use Mobile Entertainment Services (3rd Theme)

Few researchers have been conducted also on cross-cultural and cross-temporal issues in the mobile entertainment environment. Okazaki et al. (2008) examined user “behavioural intention” mobile game application for USA, Spain and Czech Republic customers by using TAM model among young users. Kondo and Ishida (2014) have examined the “behavioural intention” most frequently used mobile entertainment services (game, music, ringtone) for Japan and USA by using TAM-TPB model. Very few prior studies focus on the antecedents of user acceptance and their intentions to use mobile

entertainment services in a cross-cultural or cross-temporal context. This study also does a comparative analysis between the antecedents of user acceptance and their intentions to use mobile entertainment services in a cross-cultural (Japan 2009 and Bangladesh 2014) and cross-temporal (Japan 2009 and Japan 2014) context.

2.4 The Needs of Mobile Information Services in User's Life

From a human developmental perspective, QoL goals can be defined as improvement of human developmental needs in a community or society. I will use Abraham Maslow's concept of need hierarchy to develop the notion of a progression of improvement of needs in user life by using mobile information services. The need for self-actualization (Superordinate goal) becomes more salient given other lower order needs have been made less salient through adequate improvement (subordinate goal). In other words, Maslow (1943) argued that there is a hierarchy of needs that people strive to meet; the fulfillment of one allows release for the individual to fulfill another at a higher level. The hierarchy of needs involves the following needs ordered from lower order to higher-order needs (see figure 7). These are biological needs (e.g. food, water, oxygen, etc.); safety needs (e.g., health, trustworthy, safety, home-healthcare for physical and psychological security); social needs (e.g., family, friend, community need for affiliation, friendship, belongingness, etc.); esteem needs (e.g., work, self, need for achievement, success, recognition, etc.); and self-actualization needs (e.g., cultural, leisure, informational, educational, financial, user need for creativity, self-expression, integrity, self-fulfillment, etc.). Lower-order needs are not involved with mobile information services. Based on the needs assessment, QoL goals for mobile information services can, therefore, be set in such a way as to help the aggregate young population move toward the satisfaction of higher-order needs.

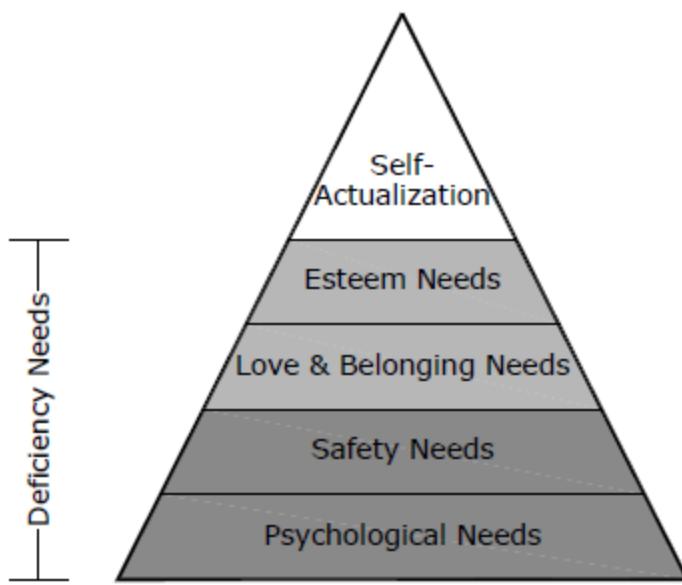


Figure 7. Maslow's (1943) hierarchy of needs

User well-being is related with the achievement of their needs and wants. If user may feel that their needs are fulfilling, they will be intend or influence to repeat the use of mobile information services. As example, play game or listen music via mobile will fulfill user's enjoyment needs anytime anywhere which ultimately improve their leisure life and contribute to improve the overall quality of life. Mobile users have needs they seek to fulfill through major activities that are segmented in life aspects (work life, leisure life, safety life, friend life, etc.). In each life aspects, people use specific mobile information services to facilitate their major activities and accomplish the goals related to those activities.

Ling discusses four most important social and cultural impacts of the mobile services. The one aspect is the increase of safety and security, where the main benefits of the mobile phone are seen in the possibility for parents to feel more secure about the safety of their children, the elderly to get help in case of emergency, and an easier possibility to call for help in case of road accidents and other injuries. The second aspect is a more effective

micro-coordination of everyday life, saving time and money, for example by enabling to change trips en-route and avoiding needless travel. The another aspect is accessibility, especially important for the young, as mobile phone makes accessing friends easier and facilitates social relationships. The effects of mobile value-added services (VAS) are somewhat similar to those of the mobile services in general. Many VAS serve the same needs that voice-calls do, although in a different way. For example, call emergency contributes to our safety and security by letting the emergency workers know where we are. So does car positioning by letting us track the location of the car, in case it is stolen. SMS-based information services, and “find the nearest” type of location-based services contribute to micro-coordination, saving us trips by providing us timely information. And SMS-chat and SMS-based flirting services, popular among teens, arguably contribute to the development of relationships.

2.4.1 Quality of Life

The term QoL has been defined differently by various scholars. McCall (1975) defines QoL as ‘necessary conditions for happiness’, while Terhune (1973) defines it as subjective well-being. There are many terms that are used to represent well-being. Commonly used terms are QoL, standards of living, human well-being, and welfare. QoL is a measure of how happy people or how fulfilled they are in terms of their various wants and needs.

2.4.2 Bottom-up Spillover hierarchy model

In the form of the bottom-up spillover theory, the improvement hierarchy model has been concretized in the QoL field (Lee and Sirgy, 1995). Many multi-attribute attitude and intention models use this theory to predict and explain attitude and behavioural intention (Lee et al., 2002). The improvement hierarchy model has been used in marketing

disciplines (particularly in user research) to explain how customers perceive and evaluate their product-use experiences (Gutman, 1982). User marketing researchers have used this logic to conceptualize the determinants of user improvement (Lee et al. 2002). This model explains the relationship between individual life domains and overall QoL (Andrews and Withey, 1976, Campbell et al. 1976, Diener, 1984, Loscocco and Roschelle, 1991). For example, mobile information services yields various benefits, including purchase or compare product information while users are shopping via mobile. This benefit is related to user activities, indicating that improvement with user activities conducted through the mobile information services increased improvement with user life, thereby enhancing overall life improvement.

The bottom-up spillover theory (Andrews and Withey, 1976) is a model of the relationship between individual life domains and quality of overall life (see figure 8). The theory indicates that quality of life in individual domains has spillover effects on overall quality of life. In other words, happiness in subordinate individual life domains can spill over to produce super ordinate overall happiness (Andrews and Withey, 1976). The bottom-up spillover theory has been concretized into the improvement hierarchy model. The premise of this model is that overall life improvement is functionally related to improvement within each of the individual life domains, which can be measured by improvement with specific events in each life domain (Sirgy, 2002). Life improvement can be explained and predicted from improvement with experiences within different life domains. For example, people may feel satisfied with their life overall as a direct result of their improvement with their job, family, friends, and material possessions (Lee et al. 2002).

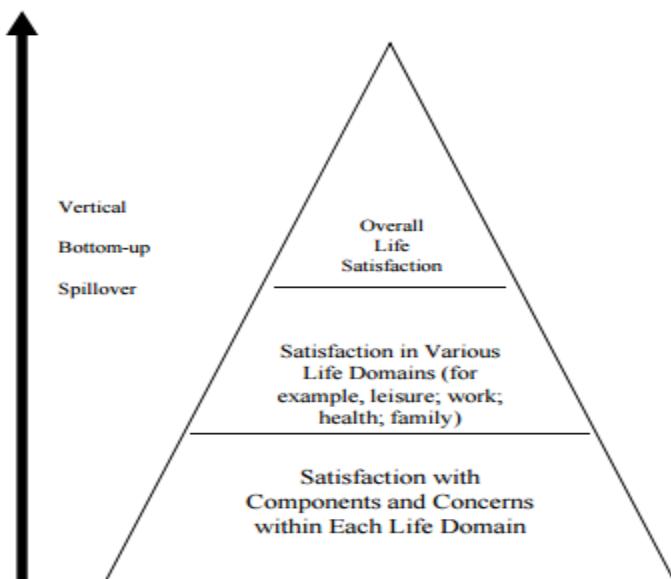


Figure 8. The hierarchy model of life improvement (Bottom-up spillover theory)
(Neal et al. 1999)

2.4.3 Individual life domains

QoL researchers have identified a number of distinct life domains that encompass the various places, things, activities, roles, and relationships in which a person typically finds himself or she involved (Andrews and Withey, 1976). They propose that people actually experience and store the various events of their life in distinct domains, including leisure life, family life, friend life, cultural life, work life, community life, user life, financial life, health life, safety life, and self-life. These eleven life domains (see table 4) have been examined for mobile data services by Choi et al. (2007a) concerning Japan and Korea.

Table 4. Life Domains for mobile services introduced by Choi et al. (2007)

Life Domains	Defining Activities, Circumstances, Events
Cultural	Activities and relationships with cultural richness
Leisure	Non-working activities, spare time activities, recreation
User	Purchase, preparation, consumption, possession, maintenance and disposition activities of goods and services
Financial	Activities for pay and revenues
Health	Activities pertaining to mental and physical health
Safety	Activities for personal safety
Family	Activities with parents, children, and home
Friend	Activities with colleagues and friends
Self	Activities for self-representation and self-efficacy
Community	Activities with on-line community
Work	Mental and physical activities required by jobs and task

2.4.4 Contribution to Quality of Life

The basic premise of the bottom-up spillover theory is that improvement levels within individual life domains affect the overall level of life improvement (Sirgy, 2002). This relationship between Individual Contribution and Overall Contribution is displayed in Fig. 6. The bottom layer of our model represents the contribution of mobile information services to quality of life in those domains (henceforth, Individual Contribution). The contribution of mobile information services to quality of individual life domains can be measured by the perceived contribution of specific use-experience of mobile information services in that domain. The top layer in Choi et al. (2007)'s model represents the specific contribution of mobile information services to overall QoL (henceforth, Overall

Contribution). Like Individual Contribution, Overall Contribution is conceptualized as the perceived contribution of mobile information services to overall QoL (see figure 9).

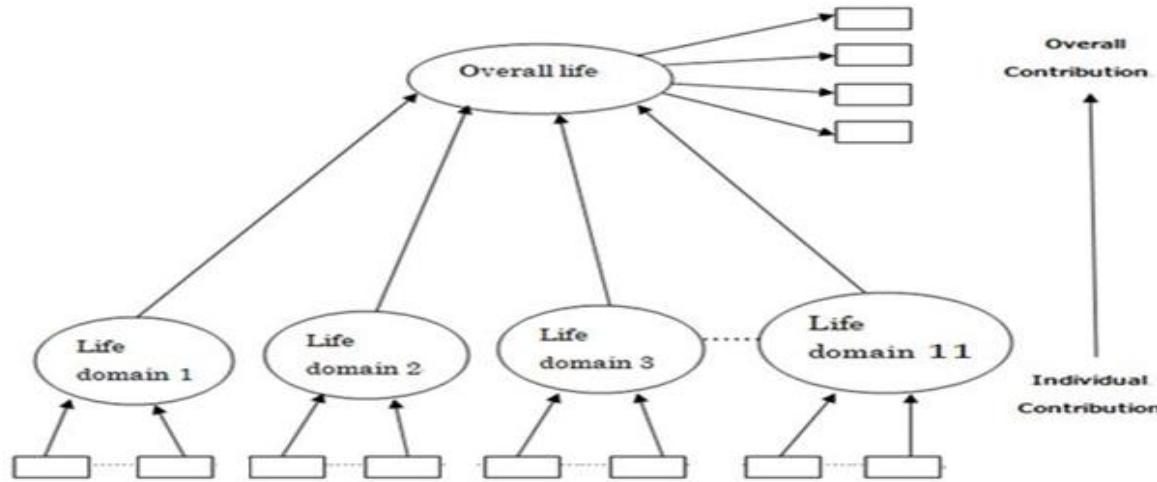


Figure 9. Relationship between Individual Contribution and Overall Contribution for mobile services (from Choi et al. 2007)

2.4.5 Research Gap on the Contribution of Mobile Information Services to Improve the Quality User's Life (4th Theme)

The overall literature clearly indicates that there is no theoretical model that can reliably and validly measure how young people's QoL has been improved owing to the mobile technology. At present we do not even know into which domains of a young user's life effect has with the current knowledge of smartphone and 3G service adoption. The main goal of this study is to construct a theoretical model that can reliably and validly measure the relationship between mobile information services and QoL. Therefore, we examine the contribution of life domains to student's "QoL" after using mobile information services for Japan which has an expanding mobile market. This study framework was grounded from the bottom-up spillover theory by Choi et al. (2007a). Later, we added four individual life

domains contribution of mobile information services to QoL: Home-healthcare life, informational life, educational life and trustworthy life. These have conceptualized from previous studies (Choi et al. 2007b; Jing and Andy, 2010; and Nguyen et al. 2010). More details will be provided in chapter six.

2.5 Related Research Studies on Mobile Information Services and Overall Research Gaps

One of the important and significant issues to identification of factors is that people to accept new technologies and information services and to use them (Gao et al. 2014). So, several research studies have done by using different theoretical models for mobile service market. Kondo et al. (2010) identified three dimensions of mobile services—information intensiveness, amusement, and service penetration rate—on the basis of the data of awareness, past use behavior, and use intention in Japan 2008. In order to learn about user needs with respect to mobile information services, in chapter three, I performed a comparison between the mobile information services needs structure of young people in Japan 2008 and 2009 and in the Japan and the United States, 2009. Therefore, I conducted a factor analysis to extract common factors that exist among similar mobile services.

User's perception regarding the use of mobile entertainment services have been identified by exploring their behavioral intention in past researches. Okazaki et al. (2008) examined user "behavioural intention" mobile game application for USA, Spain and Czech Republic customers by using TAM model among young users. Kondo and Ishida (2014) has examined the "behavioural intention" most frequent used mobile entertainment services (game, music, ringtone) for Japan and USA by using TAM-TPB model. In chapter four, I will examine the factors of student's "behavioural intention" for Bangladesh. To understand

mobile entertainment service acceptance among Bangladeshi young users, the TAM-TPB is suitable. I ground our research framework in two theoretical models. First one is the TAM-TPB model of Kondo and Ishida (2014) with their factors of perceived value, perceived behavioral control, attitude and subjective norm on mobile entertainment services intention behavior of young people. The latter added factors perceived fun, perceived convenience and perceived ease of use were from Okazaki et al. (2008).

In chapter five, I will examine whether there are differences within the antecedents of “behavioural intention” when the services used differ, focusing on multiple mobile entertainment services. I will do a cross-national analysis between Japan and Bangladesh, so that I am able to generalize the results and observe any differences. I ground our research framework in TAM-TPB model of Kondo and Ishida (2014) with their factors of perceived value, perceived behavioral control, attitude and subjective norm on mobile entertainment service intention behavior of young people.

Mobile information system is usually embedded in the user's life (Tamminen et al. 2004). Past study also suggest that mobile information services do have an influence on users' lives. As example, Choi et al. (2007a) measured the contribution of mobile technology to the quality of users' lives by using bottom-up spillover model for Korea and Japan. But there are very few studies on how young's quality of life has been improved owing to the mobile technology. Therefore, in chapter six, I will examine the contribution of life domains to student's "QoL" after using mobile information services for Japan. I ground our research framework in two. First one is the bottom-up spillover theory by Choi et al. (2007a) with their eleven individual life domains contribution of mobile information services to QoL. These life domains are: leisure life, family life, friend life, cultural life, work life, community

life, user life, financial life, health and safety life, and self-life. Second, our newly proposed four individual life domains contribution of mobile information services to QoL: Health monitoring life, informational life, educational life and trustworthy life. These have conceptualized from previous studies (Choi et al. 2007b; Jing and Andy, 2010; and Nguyen et al. 2010). Specific research gaps in the literature which have identified in this chapter are in table 5.

Table 5. Specific gaps in the literatures

Theoretical Gap	Methodological Gap
<p>1. Very few studies associated on need analysis of mobile information services based on use intention data.</p> <p>2. Factors' influencing behavioural intention to use mobile entertainment services in a developing country (ex. Bangladesh) has not Studied yet.</p> <p>3. Cross-country and cross-temporal studies on behavioural intention of mobile entertainment services have not associated much.</p> <p>4. There is no study to understand how mobile information services contribute to quality of life with current knowledge.</p>	<p>5. Application of covariance structure analysis on mobile entertainment services for a developing country context</p> <p>6. No generalizable findings are available in usage intention and QoL outcome variables for mobile information services.</p>

2.6 Summary

Overall, the review of literature in the research context and theories (Chapter 2) identifies some crucial findings and gaps, which solidify the foundation of the research model proposed in the next chapter (Chapter 4: theoretical framework and hypotheses). This thesis adds to previous researches by further exploring the behavioural intention and quality of life in terms of mobile service usage context, most importantly by analyzing the relationships of behavioural intention, quality of life and their behavioural consequences.

Chapter Three

Theoretical Framework and Hypotheses

3.1 Overview

The objective of this chapter is to develop study framework with respect to mobile information services usage behaviour for the interconnected objectives (chapter 1) based on the research findings and gaps identified and synthesized in Chapter 2 (Literature Review - Theory). As such, the chapter aims to conceptualize the dimensions of the usage behaviour of mobile information services to measure their impact on economical (acceptance of mobile information services) and social (quality of life) outcome variables.

3.2 (1st Theme): Classify the Need structure of Mobile Information Services in Japan and the United States

By the end of 2010, there were 5.3 billion mobile subscriptions worldwide. That equates to 77% of the world's population (International Data Corporation, 2011). This represents a large increase from the 4.6 billion mobile subscriptions in existence at the end of 2009. The increase in mobile service usage around the world has been driven by both advanced technologies and the growing number of service options available to users. For the most part, these services include mobile searches, news and sports information, music and video downloads, e-mail, and instant messages (International Data Corporation, 2011). The explosive growth in the use of mobile services is frequently noted in research studies (Barnes and Scornavacca, 2004; Massoud and Gupta, 2003).

Despite the growing importance of mobile devices, few studies have been conducted using a cross-national approach. The usages of mobile devices vary considerably among

different countries (Pedersen, 2001). As mobile carriers and content providers perform on a global scale (Haghrian and Madlberger, 2005), empirical cross-national research on mobile services has become increasingly relevant. A clear understanding of the mobile service needs of users can be achieved by investigating the structure of mobile services across different countries. In order to learn about user needs with respect to mobile information services, and whether users in different countries perceive these needs differently, I performed a comparison between the mobile information services needs structure of young people in Japan and the United States. These locations were selected for this international comparison because they are the two leading countries in the mobile market and because they use mobile services differently. If there are differences in service needs structures between two countries, mobile companies need to vary their international marketing strategies and tactics between the countries by adjusting for the differences. The following strategies can be used: introduce very high-spec devices, offer multiple technologies (picture messaging, mobile Flash, GPS, etc.), low price strategy; provide better network quality and coverage, etc. Different country can take different strategy. For finding which strategy to take, I should classify the needs of different time periods and countries with respect to mobile information services. To achieve this, here I will investigate the mobile services needs structure over a two-year periods in Japan (Japan 2008 and Japan 2009). Not only has this but also classify the mobile services needs structure over a two countries (Japan 2009 and USA 2009).

3.2.1 Mobile Information Services in the United States and Japan

Most people today have a mobile phone, and many use them for mobile services beyond just calling and messaging. The mobile service market is growing rapidly. However, there

are also many new service providers competing for customers, so it is very important to understand user usage behavior. This can be achieved easily by comparing user behavior on the basis of regions. The needs and uses of these services differ from country to country. The United States is in its early stages of M-commerce development and adoption as compared to many European and Asian countries (e.g., Sweden, Japan, and Korea) (Chew, 2006).

This is true despite the fact that mobile application usage is slightly higher in the United States than that in Japan. In the United States, 19% fewer application users utilize their browser than in Japan, while 19% fewer browser users utilize applications. Messaging methods also vary. The United States displays the highest rate of text messaging, with 68.0% of users sending text messages compared with just 41.6% in Japan. Japanese users exhibit the highest reach in the e-mail category at 57.1%, while users in the United States are most likely to use text messaging services on their mobile devices (68.0%). Social networking/blogs reached the greatest percentage of mobile users in the United States at 24.7%, followed by Japan at 19.3%. Japanese users were most likely to capture photos (62.9%) and watch TV/video (22.8%) on their mobile devices, while users in the United States were most likely to listen to music (15.7%) and play games (23.2%) (Haghrian and Madlberger, 2005).

Mobile phone users in certain countries, such as Japan, use integrated services, such as receiving messages regarding credit card usage, enjoying windows live messenger and other instant messenger systems, receiving messages from online community services, receiving promotional price discounts for family restaurants, and receiving coupons. Pioneers of location-based services—such as Korea and Japan—have created precise

combinations of infrastructure and applications needed to ensure success (Yoon, 2008).

Mobile service uses behavior in Japan and the United States, 2010 has shown in table 6.

Table 6. Mobile service uses behavior in Japan and the United States, 2010

Countries	USA	Japan
Used connected media		
Browser, app or download	46.70%	76.80%
Used browser	36.40%	55.40%
Used application	34.40%	53.30%
Used messaging		
Sent text message	68.00%	41.60%
Instant messaging	17.20%	3.60%
Email	30.50%	57.10%
Accessed entertainment/social media		
Took photos	52.40%	62.90%
Social networking or blog	24.70%	19.30%
Played games	23.20%	16.30%
Recorded video	20.20%	15.80%
Listened to music	15.70%	12.90%
Watched TV and/or video	5.60%	22.80%
Accessed financial services		
Bank accounts	11.40%	7.00%
Financial news or stock	10.20%	16.50%
Accessed news, sports, weather, search, retail, travel, reference		
News and information	39.50%	57.60%
Weather reports	25.20%	34.70%
Search	21.40%	31.50%
Maps	17.80%	17.10%
Sports news	15.80%	18.20%
Restaurant info	10.00%	9.70%
Traffic reports	8.40%	14.00%
Classifieds	7.30%	3.60%
Retail site	6.50%	8.50%
Travel service	4.40%	2.90%

To classify the needs of different time periods and countries, here I will investigate the needs of different time periods and countries with respect to mobile information services.

To achieve this, here I will investigate the mobile services needs structure over a two-year periods in Japan (Japan 2008 and Japan 2009). Not only has this but also classify the mobile services needs structure over a two countries (Japan 2009 and USA 2009). The next section presents a background and overview of the study of mobile services in Bangladesh, the basic TAM-TPB model, and the modified TAM-TPB and hypotheses for 2nd theme.

3.3 (2nd Theme): Behavioural Intention to Use Mobile Entertainment Services among Bangladeshi Students

Mobile technologies and services worldwide are expected to create a tremendous spectrum of business opportunities. The International Telecommunication Union (2014) estimated the number of mobile subscribers at about seven billion, accounting for 95.5% of the world population. In recent years, the use of mobile phones has moved beyond point-to-point voice communications to a variety of content services, among which entertainment services are currently the dominant driver of data traffic. Mobile entertainment is any type of leisure activity consumed via mobile devices (Wong and Hiew, 2005) using a wireless telecommunication network that incurs a cost upon usage and interacts with service providers. Mobile entertainment comprises a range of activities, including ringtone, music, and movie downloads and games. Many nations consider this converging market of entertainment and mobile telecommunication industries over mobile networks to be a new driver of national growth (KIPA, 2005). For example, Bangladesh, which is experiencing success in the commercialization of mobile networks, is striving to develop local entertainment-related products such as mobile games, music, etc.

Mobile operators in Bangladesh have a limited but growing footprint in the value added services space with a focus on entertainment services. Mobile value added services in Bangladesh were categorized into two groups by GSMA Intelligence in 2014: entertainment and development services. Mobile operators are providing entertainment services such as games, music as well as social media, ringtones, and other entertainment services in Bangladesh (GSMA Intelligence, 2014). Convergence among the growing industries – smartphones, the mobile Internet, and third-generation mobile connection – has led to the

creation of an emerging entertainment market for mobile commerce. This study considers mobile entertainment services (MES) because this market is rapidly expanding in Bangladesh while still in the developing stage.

Several studies have been conducted on Bangladesh's mobile service market. User choice behaviour towards mobile phone operators in Bangladesh has been measured by Hasan et al. (2013). Islam et al. (2011) found that the factors influencing the adoption of M-commerce in Bangladesh were awareness and knowledge, convenience of mobile devices and handsets, pricing and cost, security and privacy, rich and fast information, and perceived usefulness. For mobile entertainment services in Korea, individuals' compatibility beliefs were found to significantly influence use behaviour (Kim et al., 2013). In the context of encouraging mass market adoption of mobile entertainment services in Malaysia, the importance of useful and relevant new applications and services and a suitable pricing scheme was addressed by Wong and Hiew (2005). However, there is no research that has been conducted covering the mobile entertainment services for Bangladesh market. The present study is an ample step in covering this gap. Here I consider Game, music and ringtone as mobile entertainment services. This study examines the antecedents of intention to use focusing on multiple mobile entertainment services in the context of a developing country, Bangladesh, where the mobile entertainment market is currently emerging. Kondo and Ishida (2014) suggested that the TAM-TPB is suitable for understanding the acceptance of multiple mobile entertainment services by young users in two developed countries. The model is expected to be valid for examining young users in a developing country after adjusting for time differences. Therefore, I ground the research framework in two theoretical models. The first is the TAM-TPB model of Kondo and Ishida

(2014), who took the ‘perceived usefulness’ construct from the original TAM and modified it into ‘perceived value for (PV)’ for their TAM for mobile entertainment services, Second, to apply the TAM–TPB model of Kondo and Ishida (2014) to a developing country using the specific constructs of perceived fun, perceived convenience, and perceived ease of use, drawing from Okazaki et al.’s (2008) TAM models, for a single mobile entertainment services–gaming. Users may employ mobile entertainment services if their use is intrinsically enjoyable, free of physical or mental effort, and convenient. The framework of our proposed TAM–TPB is thus developed by using general perceived fun, perceived convenience, and perceived ease of use and by incorporating ‘perceived value (PV)’, ‘attitude (ATT)’, ‘subjective norm (SN)’, and ‘perceived behavioural control (PBC)’.

3.3.1 Theoretical Framework and Hypotheses

Market expansion mechanism can be identified by determining the factors involved in the adoption of the services at an early stage. In information technology (IT) research, many theories have been applied to discover the determinants of IT adoption (Agarwal and Prasad, 1999). Among these, Kondo and Ishida (2014) recently introduced a TAM–TPB model for cross-national (Japan vs. the US) analyses of the intention to use multiple mobile entertainment services (MES). They utilized the model for mobile entertainment services in the US and Japan based on a 2009 data set of young users. Adoption was still in the early stage before the expansion of mobile entertainment services begun with the introduction of the iPhone 4 in 2010. I consider that Bangladesh in 2014 is at the same introduction stage for the adoption of smartphones and 3G services for entertainment that Japan and the US were at in 2009. Therefore, I conducted this study in the context of a developing country, Bangladesh, by using the TAM–TPB model of Kondo and Ishida (2014) as a basis to confirm

their reasoning. The TAM-TPB model of Kondo and Ishida (2014) has explained fully in 2.3.4 section of chapter 2.

The TAM-TPB model (figure 6) is an effective predictive model in field that leads to a certain degree of behavioral change by individuals have summarized by Kondo and Ishida (2014). Their TAM-TPB is developed by using the effects of perceived behavioural control, subjective norm and attitude on users' intentions to use mobile services. I thus observe whether perceived behavioural control, subjective norm and attitude influence intention to use mobile entertainment services. The study hypotheses, applying the Kondo and Ishida (2014) TAM-TPB to the Bangladesh context, are as follows:

H1. Attitude positively influences behavioural intention for mobile entertainment services in Bangladesh.

H2. Subjective norm positively influences behavioural intention for mobile entertainment services in Bangladesh.

H3. Perceived behavioural control positively influences behavioural intention for mobile entertainment services in Bangladesh.

H4. Perceived behavioural control positively influences attitude towards mobile entertainment services in Bangladesh.

Kondo and Ishida (2014) used the concept of perceived value for mobile entertainment services. Their modified TAM-TPB differs from the original TAM in using 'perceived value' rather than 'perceived usefulness'. The TAM explains users' intention to use technology. Therefore, I examine whether perceived value influences intention to use mobile entertainment services. I postulate the following hypotheses:

H5. Perceived behavioural control positively influences perceived value for mobile entertainment services in Bangladesh.

H6. Perceived value positively influences attitude towards mobile entertainment services in Bangladesh.

H7. Perceived value positively influences behavioural intention for mobile entertainment services in Bangladesh.

3.3.2 Proposed Conceptual Model and Related Hypotheses

I extend our model by adding some factors on behavioral behavioural intention from related model. I am trying to use the hedonic and utilitarian concept on TAM-TPB model. The hedonic (intrinsic) and utilitarian (extrinsic) value components frame the behavioral behavioural intention (Holbrook, 1994). Attitude to be “an overall evaluation, encompassing both utilitarian and hedonic components” and find that it completely mediated the effects of two antecedents, fun and usefulness (Bruner and Kumar, 2005). Perceived ease of use, perceived enjoyment and perceived attractiveness are antecedents of attitudes for online gaming adoption which has hedonic and utilitarian instincts (Ha et al. 2007 and Hsu and Lu, 2004). Few previous researches on mobile entertainment services have focus on this concept. Therefore, I will study these three additional factors perceived fun, perceived convenience and perceived ease of use which may have influence on attitude.

Perceived fun:

I add to my model, perceived fun which represents the level of the hedonic component of mobile entertainment services. Enjoyment can be defined as the degree to which performing an activity is perceived as providing pleasure and joy in its own right (Venkatesh, 2000). Compared to information system uses, enjoying mobile service is more

experience-oriented. Enjoyment affects the use of experiential mobile services (i.e., contact and gaming) more strongly than the use of goal-oriented mobile services for Norwegian users. (i.e., SMS and payment) (Nysveen et al. 2005). Whereas, Wahab et. al. (2011) for Jordan and Dai and Palvia (2009) for China obtained no significant relationship between enjoyment and mobile phone services. There is a conflict between the two results. So, here the authors observe whether perceived fun influence the attitude that users experience in mobile entertainment services. So, our hypothesis is:

H8: Perceived fun will directly and positively affect attitude toward mobile entertainment services in Bangladesh.

Perceived convenience:

Our model includes perceived convenience as an antecedent of attitude. Perceived convenience departs from perceived usefulness in the TAM. Dabholkar and Bagozzi (2002) argue that the dimension of usefulness is appropriate for products such as computer software but not relevant for technology-based self-service, in which the consumer participates but which he or she does not own. Instead, they suggest “performance,” which encompasses the reliability and accuracy of the service while also representing the “did its job” dimension developed by Meuter et al. (2000), on the causes of consumer satisfaction related to technology-based self service. This term may be defined as agility, accessibility, and availability of a service, which is flexible in time and location (Okazaki et al. 2008). For handheld mobile gaming, what is relevant is neither reliability nor ownership but the “it fits my life” dimension, which addresses why the games must be played in this context. The mobile device is essentially a ubiquitous device and enables the consumer to be entertained at any time, in any place. At the same time, this dimension crystallizes the core utilitarian values

of mobile games: simplicity in design, functionality in technology, and practicality in use. By the same token, this study proposes perceived convenience. Our study postulates attitude is the consequence of the perceived convenience that users experience in mobile entertainment services. Thus, the hypothesis is:

H9: Perceived convenience will directly and positively affect attitude toward mobile entertainment services in Bangladesh.

Perceived ease of use:

Perceived ease of use, refers to the extent to which an individual believes that the use of a mobile entertainment will be free of effort (Venkatesh, 2000). Previous literature provides inconsistent results perceived ease of use and attitude that show how perceived ease of use influences attitude significantly (Bruner and Kumar, 2005). They found perceived ease of use has only an indirect effect on attitude. Perceived ease of use has a direct effect on the perceived fun and perceived convenience dimensions, but not on attitude. By the same token, our study proposes perceived ease of use posited by Okazaki et al. (2008). Thus, the hypothesis is:

H10: Perceived ease of use will directly and positively affect perceived fun in mobile entertainment services for Bangladesh.

H11: Perceived ease of use will directly and positively affect perceived convenience in mobile entertainment services for Bangladesh.

Perceived value, perceived fun, perceived convenience and perceived ease of use represents user perception regarding added value to mobile information services. Since all of these constructs basic is same, to add value but in this study the instruments that have used to predict these constructs, have different characteristics. Perceived value has the

characteristics of price and quality which represents monetary and performance/quality value dimensions (Boontarig et al. 2012). Perceived fun has the characteristics of enjoyment which represents hedonic value dimension (Chiu et al. 2005; Lee and Overby, 2004). Perceived convenience has the characteristics of practicality or functionality and perceived ease of use has the characteristics of technologically user friendly which represent the utilitarian value dimension (Chiu et al. 2005); Lee and Overby, 2004). The instrument characteristics itself differentiate from each other by adding different dimension of values. So, it is reasonable to use these constructs in this study. The proposed TAM-TPB model for the 2nd theme is in figure 10.

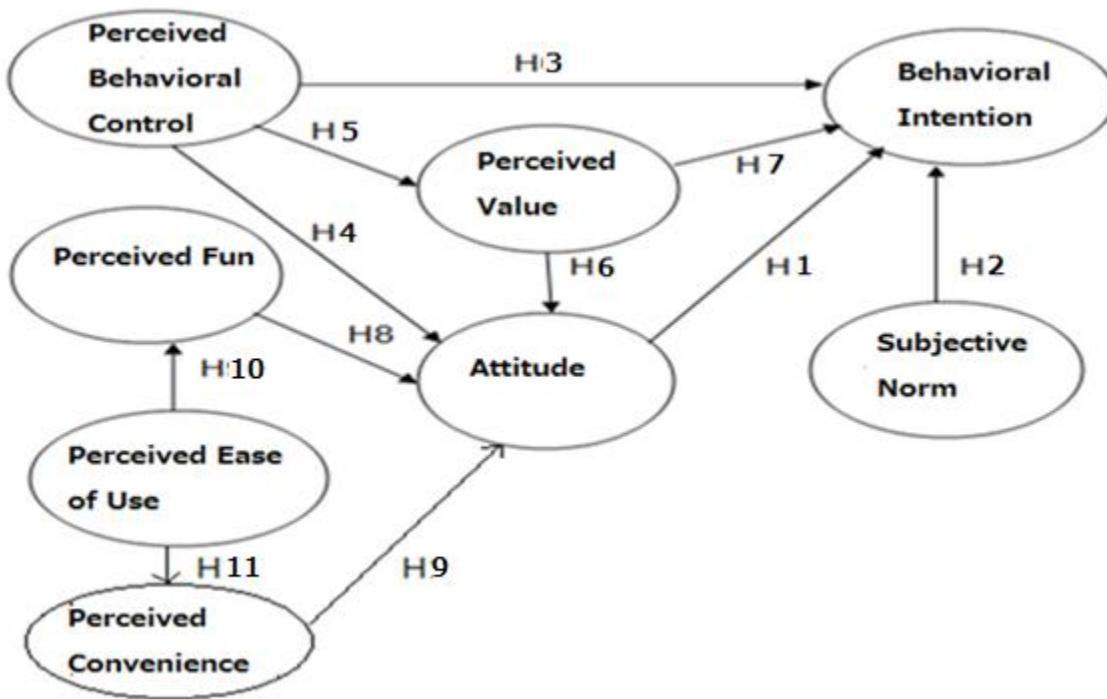


Figure 10. Proposed TAM-TPB Model

Usage patterns of mobile entertainment services may have differences or similarities among countries. I focus on entertainment services (game, music and ringtones) for

Bangladesh analysis. Four factors of mobile services have identified by Ghyas et al. (2011): Information intensiveness (Factor 1), entertainment (Factor 2), low penetration service (Factor 3), and communication service (Factor 4) on Japan data. Factor 2 represents services with entertainment characteristics. In our study, I focus on Factor 2. Specifically, the following entertainment services are examined: Games, music, and ring tones. Kondo and Ishida (2014) also researched these services for USA and Japan. The next section presents a research background and overview of the study of similarities and differences of mobile information services in Japan and Bangladesh, the basic TAM-TPB model and hypotheses for 3rd theme.

3.4 (3rd Theme): Behavioural Intention to Use Mobile Entertainment Services among Young Users in Japan and Bangladesh: Comparative Cross-country and Cross-temporal Studies

Mobile phone services offer a wide range of purposes from business to entertainment and a mobile phone has become a ubiquitous tool in technologically developed or developing places all around the world. There are nearly 7 billion mobile subscriptions worldwide (The International Telecommunication Union, 2014). This is equivalent to 95.5 percent of the world population. Mobile market growth is being driven by demand from the developing world, led by rapid mobile adoption in China and India, the world's most populous nations. There are 5.4 billion mobile subscriptions in the developing world – that's 78 percent of global. Mobile penetration in the developing world now is 90.2 percent, but there is still potential for growth. On the other hand, mobile subscriptions in the developed world is rapidly reaching saturation point. There are 1.5 billion subscriptions in

developed nations with 120.8 percent mobile penetration. There is already more than one mobile subscription per person in developed nations as like Japan and USA.

There are significant business opportunities in relation with mobile entertainment service all over the world. Even there is a little room for growth of mobile services in developed countries; the sales of mobile entertainment services by global Internet companies such as DeNA and GREE are expanding the market of mobile services, with a focus on social games, e-commerce, and web services for mobile devices (kondo and Ishida, 2014). It has been reported that by 2015 mobile content could be worth well in excess of \$1 trillion, with voice comprising only a 10% share of the market. Especially, the market value of mobile entertainment service is increasing markedly and the number of users is growing rapidly. For the first time since the launch of the iPhone back in 2007, Japan is the top grossing country for iPhone's most popular content: games. Japan that has a history of spending billions on mobile games before the arrival of smartphones and tablets, is taking to the app stores of Google and Apple big time. It has estimated that 160 billion apps will be downloaded in 2017, gaming being one of the fastest growing segment for Japan. Mobile operators in Bangladesh have a limited but growing footprint in the value added services space with a focus on entertainment services. Mobile value added services in Bangladesh were categorized into two groups by GSMA Intelligence in 2014: entertainment and development services. Mobile operators are providing entertainment services such as games, music as well as social media, ringtones, and other entertainment services in Bangladesh (GSMA Intelligence, 2014). Convergence among the growing industries – smartphones, the mobile Internet, and third-generation mobile connection – has led to the creation of an emerging entertainment market for mobile commerce. This study considers

mobile entertainment services (MES) because this market is rapidly expanding in Bangladesh while still in the developing stage. With the growing importance of Mobile entertainment services, it is important to identify the factors relating to user intention to obtain mobile entertainment services and investigate their antecedents for current and future service development.

User's perception regarding the use of mobile entertainment services have been identified by exploring their behavioral intention in past researches. Quan et al. (2010) researched a category of mobile transaction services in China using a TAM-TPB approach. They found that a combined TAM-TPB model is suitable for evaluating the potential "behavioural intention" specific mobile commerce services. Nysveen et al. (2005) developed and tested a modified TAM-TPB in order to explain users' "behavioural intention" four types of mobile services. Even though research in mobile service behavioral intention has used the TAM-TPB extensively, the literature contains little regarding its applicability to mobile entertainment services market. So, here we apply the novel approach to assess the potential adoption of mobile entertainment services through a cross-national analysis based on the technology acceptance model (TAM) and the theory of planned behavior (TPB).

Here we examine whether there are any similarities or differences within the antecedents of "behavioural intention" when the services used differ in different countries (Japan 2009 and Bangladesh 2014) and time periods (Japan 2009 and Japan 2014), focusing on multiple mobile information services. Most past studies have focused on adoption of task-oriented technology. Adoption of entertainment-oriented technology such as mobile entertainment service has hardly been addressed. As indicated in the study by

Hsu et al. (2004), the factors influencing the adoption of entertainment-oriented technology are different from the factors influencing the adoption of task-oriented technology. This provides a need for undertaking this study. We also do a cross-national analysis between developed and developing countries, so that we are able to generalize the results and observe any differences. To understand the similarities or differences of mobile entertainment service acceptance between Japan 2009 and USA 2009, the TAM-TPB is suitable as it is suggested by Kondo and Ishida (2014). So, the research framework of this study has grounded in TAM-TPB model of Kondo and Ishida (2014) with their factors of perceived value, perceived behavioral control, attitude and subjective norm on mobile entertainment service intention behavior of young people.

3.4.1 Overview of Mobile Services in Japan and Bangladesh

There are 14 countries in the world with over 100 million mobile subscriptions; among them Japan has positioned seven and Bangladesh has positioned twelve. In Japan, there were 111 million mobile subscribers, 92.5 million of them use mobile data services – that's 83 percent of the subscriber base, or 72 percent of the population (Telecommunications Carriers Association Japan, 2010). There are about 69 million mobile Internet users, which equals 62 percent of mobile subscribers in total. According to Com Score's excellent 2010 Mobile Year in Review (February 2011), 16.3 percent of Japanese customers are playing games and 12.9 percent are listening music via mobile.

In recent years, the uses of mobile phones have witnessed tremendous growth in Bangladesh. The total number of Mobile Phone subscriptions has reached 118.49 million at the end of September 2014. Mobile phone penetration rate was 69.5% in 2014 (BTRC, 2014). Mobile service users among adults are actually above 50% in Bangladesh (GSMA

intelligence, 2014). Bangladesh is predominantly a prepaid and 2G markets, as 3G has only recently been deployed following delays in the auction process (3G today makes up just 2% of connections). However, mobile Internet penetration is over 20%, mostly from 2G feature phones. In other words, there is a potential desire for Internet access that is growing. Mobile operators in Bangladesh are concentrated in the entertainment category. Mobile services in Bangladesh have categorized in two categories: Entertainment and development services. Among them, general entertainment services (news, religion, games, music, etc.) are mostly used services. Table 7 shows the mobile market of Japan and Bangladesh by number of subscriptions in 2013.

Table 7. Mobile markets by number of subscriptions in 2013

Rank	Country	Mobile subscriptions in millions	% of population	3G/4G subscriptions in millions	% of population
7	Japan	137.9m	108.0%	108.8m	85.3%
12	Bangladesh	116.0m	75.0%	34.6m*	22.3%*

Source: Paul Lambert, Informa (Q2 2013); national telecoms regulators

* Bangladesh: mobile Web subscribers (not necessarily 3G)

3.4.2 Theoretical Framework

3.4.2.1 TAM-TPB framework

Emerging information technology cannot deliver improved organizational effectiveness if it is not accepted and used by potential users. Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB) are the most successful and effective models for measurements of digital device based usage among practitioners and academics. Several researches have done by using different theoretical model for mobile service market. TAM model was investigated for mobile application use by Seok Kang (2014). TPB Model was studied for customers in India on mobile entertainment services (games, music, videos,

camera, and Internet access) (Kumar and Janaki, 2011). There are very few studies which used TAM-TPB model for mobile entertainment service. The TAM-TPB model (figure 6) is an effective predictive model in field that leads to a certain degree of behavioral change by individuals have summarized by Kondo and Ishida (2014). Their TAM-TPB is developed by using the effects of perceived behavioural control, subjective norm and attitude on users' intentions to use mobile services. I thus observe whether perceived behavioural control, subjective norm and attitude influence intention to use mobile entertainment services for Japan 2009, Bangladesh 2014 and Japan 2014.

3.4.2.2 Cross-Country study

Market expansion mechanism can be identified by determining the factors involved in the adoption of the services at an early stage. Kondo and Ishida (2014) recently introduced a TAM-TPB model for cross-national (Japan vs. the US) analyses of the intention to use multiple mobile entertainment services (MES). They found close similarities between Japanese and U.S. mobile service usage by young adults through their proposed TAM-TPB model; thus, they assumed this pattern can be considered as universalities or generalities of mobile service use. They utilized the model for mobile entertainment services in the US and Japan based on a 2009 data set of young users. Adoption was still in the early stage before the expansion of mobile entertainment services begun with the introduction of the iPhone 4 in 2010. I consider that Bangladesh in 2014 is at the same introduction stage for the adoption of smartphones and 3G services for entertainment that Japan and the US were at in 2009. I assumed user's behavior mechanism assumed will be homogenous between these countries (Japan 2009 and Bangladesh 2014). Therefore, I conducted this comparative study between Japan and Bangladesh, by using the TAM-TPB model of Kondo

and Ishida (2014) as a basis to confirm their reasoning. The study hypotheses will apply the Kondo and Ishida (2014) TAM-TPB model (section 2.3.4 in chapter 2 and section 3.3.1 in chapter 3) for the comparative analysis between Japan 2009 and Bangladesh 2014, are as follows:

H12. Attitude positively influences behavioural intention for mobile entertainment services in Japan 2009 and Bangladesh 2014.

H13. Perceived behavioural control positively influences Attitude towards mobile entertainment services Japan 2009 Bangladesh 2014.

H14. Perceived behavioural control positively influences perceived value for mobile entertainment services Japan 2009 and Bangladesh 2014.

H15. Perceived value positively influences attitude towards mobile entertainment services Japan 2009 and Bangladesh 2014.

H16. Perceived value positively influences behavioural intention for mobile entertainment services Japan 2009 and Bangladesh 2014.

3.4.2.3 Cross-Temporal study

A static view of the influence of variables such as those in TAM-TPB on mobile entertainment usage has primarily taken by Kondo and Ishida (2014); they have not considered how the influence of those factors may change as users experience with the technology changes over the course of a service system's lifecycle. Mobile entertainment services such as gaming services are characterized as experiential services (Nysveen et al. 2005). The model of intention to use mobile entertainment services may vary across different life cycle stages (introduction and growth stages) of smartphone and 3G/4G services. Different variables within the model may have different influences on intention

depending on experience of smartphone and 3G/4G service usages. Flow of experience is involves with skill and control over using behavior which predict perceived behavioural control also (Hoffman and Novak 1996). Therefore, this study expecting that there will be some difference in the path from perceived behavioural control to behavioural intention between Japan 2009 and Japan 2014 because mobile users in 2014 has more experienced with past using behaviour of mobile entertainment services compare to 2009; as example, smartphone browser game. Therefore, user's behavior mechanism assumed to have some difference in the path from perceived behavioural control to behavioural intention between Japan 2009 and Japan 2014. Here, I conducted a cross-temporal study in the context of intention to use mobile entertainment services in Japan highlights the earlier and later moment of mobile information service adoption in 2009 and 2014 in terms of experience with past using behaviour. The study hypotheses will apply the Kondo and Ishida (2014) TAM-TPB model (section 2.3.4 in chapter 2 and section 3.3.1 in chapter 3) for the comparative analysis between Japan 2009 and Japan 2014, are as follows:

H17. Attitude positively influences behavioural intention for mobile entertainment services in Japan 2009 and Japan 2014.

H18. Perceived behavioural control positively influences Attitude towards mobile entertainment services Japan 2009 and Japan 2014.

H19. Perceived behavioural control positively influences perceived value for mobile entertainment services Japan 2009, Japan 2014 and Bangladesh 2014.

H20. Perceived value positively influences attitude towards mobile entertainment services Japan 2009 and Japan 2014.

H21. Perceived value positively influences behavioural intention for mobile entertainment services Japan 2009 and Japan 2014.

H22. Subjective norm positively influences behavioural intention for mobile entertainment services Japan 2009 and Japan 2014.

H23. Perceived behavioural control positively influences behavioural intention for mobile entertainment services Japan 2009 and Japan 2014.

The definition of mobile entertainment as any type of leisure activity consumed on mobile devices that utilizes the wireless telecommunication network which incurs a cost upon usage and interacts with service providers (Wong and Hiew, 2005). They included downloading ring tone, logo, music and movie; playing games, accessing location-based entertainment services and etc. as mobile entertainment services. Usage patterns of mobile entertainment services may have differences or similarities among countries. Four factors of mobile services have identified by Ghayas et al. (2011): Information intensiveness (Factor 1), entertainment (Factor 2), low penetration service (Factor 3), and communication service (Factor 4) on Japan and USA data. Factor 2 represents services with entertainment characteristics. To investigate the behavioural intention behavior, we focus on Factor 2 entertainment services (game, music and ringtones) for our cross-national analysis. Kondo and Ishida (2014) also researched these services for USA and Japan. Here we consider Game, music and ringtone as mobile entertainment services for the comparison of Bangladesh and Japan.

3.5 (4th Theme): The Contribution of Mobile Information Services to Fulfill User's Needs by Improving their Quality of Life in Japan

The performance of a traditional information system (IS) is usually measured in terms of how effective it is at achieving specific need and goals (Gefen et al. 2003) or how satisfying it is to use for particular tasks (e.g., Bhattacherjee and Premkumar (2004). One of the goals of any technology should be to increase the quality of its users' lives (Straub and Watson, 2001). The needs and uses of mobile information services may differ on the basis of age. If there are any differences present in service needs between young and older, mobile companies need to vary their international marketing strategies and tactics.

Prior studies of mobile computing have employed improvement (Choi et al. 2005) and behavioural intention (Yang, 2005) to investigate the impact of mobile computing technologies. These outcome variables measure users' feelings or attitudes at the time they use the system, rather than the impact of the system on their overall quality of life (QoL). Very few studies directly addressing the impact of IS on overall QoL. Rahman et al. (2005) presented a picture of conditions of the world with respect to such interrelated domains of QoL. Choi et al. (2007a) proposed eleven relationships between Individual Contribution and Overall Contribution of QoL in Korea and Japan and found some of them had stronger influence on the Overall Contribution.

Four factors of mobile services have identified by Ghayas et al. (2011): Information intensiveness (Factor 1), entertainment (Factor 2), low penetration service (Factor 3), and communication service (Factor 4) on Japan 2008 and 2009 data. Factor 1 refers to services that require a high degree of information, such as radio, the Internet, learning, health, infotainment content, stock trading, shopping services, coupon and advertising information

services, online storage services, reservation or booking, and location-based services. Many Japanese people look at their mobile device as a central source of information gathering. This leads to a Keitai (mobile phone) Culture that is more obvious in Japan than in other countries, partially because of the Japanese people's affection for technology in general.

There are also very few studies on how young people's QoL has been improved owing to the mobile technology. At present we have little sense of how much mobile information services affects young's QoL, because, as said, QoL has largely been ignored in mainstream IS literature. At present we do not even know into which domains of a young user's life effect has. Few studies have actually developed to analyze the relationship between mobile technology and QoL. The main goal of this study is to construct a theoretical model that can reliably and validly measure the relationship between mobile information services and QoL. We designate "contribution to QoL" as an alternative outcome variable for mobile information services and examine through a consecutive empirical study in Japan, whether and how mobile information services contribute to young users' QoL.

Therefore, we examine the contribution of life domains to student's "QoL" after using mobile information services for Japan which has an expanding mobile market. We ground our research framework in two. First one is the bottom-up spillover theory by Choi et al. (2007a) with their eleven individual life domains contribution of mobile information services to QoL. These life domains are: leisure life, family life, friend life, cultural life, work life, community life, user life, financial life, health and safety life, and self-life. Second, our newly proposed four individual life domains contribution of mobile information services to QoL: Home-healthcare life, informational life, educational life and trustworthy life. These

have conceptualized from previous studies (Choi et al. 2007b; Jing and Andy, 2010; and Nguyen et al. 2010). More details will be provided later.

The rest of the article is organized as follows. The next sections will describe the overview of QoL, individual life domains with new ones, bottom-up spillover theory, and contribution to QoL. These are followed by sections on methodology and statistical results. The last sections present a summary of the discussion, conclusions, implications and directions for future research.

3.5.1 Quality of Life (QoL)

The term QoL has been defined differently by various scholars. McCall (1975) defines QoL as 'necessary conditions for happiness', while Terhune (1973) defines it as subjective well-being. There are many terms that are used to represent well-being. Commonly used terms are QoL, standards of living, human well-being, and welfare. QoL is a measure of how happy people or how fulfilled they are in terms of their various wants and needs.

Studies of QoL have been conducted in diverse areas, including marketing (e.g. Sirgy, 1996, health (e.g. Leung et al. 2004), and education (e.g. Huebner and Gilman, 2002). However, only a few studies have been conducted in the area telecommunication services for young users. Here we will try to measure the contribution of mobile information services empirically and will provide a theoretical model that explicitly linked mobile information services and QoL for young users in Japan.

3.5.2 Proposed individual life domains

QoL researchers have identified a number of distinct life domains that encompass the various places, things, activities, roles, and relationships in which a person typically finds himself or herself involved (Andrews and Withey, 1976). They propose that people actually

experience and store the various events of their life in distinct domains, including leisure life, family life, friend life, cultural life, work life, community life, user life, financial life, health life, safety life, and self-life. These eleven life domains have been examined for mobile data services by Choi et al. (2007a) concerning Japan and Korea. Our newly added life domains are educational life (Andrews and Withey, 1976, Choi et al. 2007b), home-healthcare life (Jing and Andy, 2010), trustworthy life (Jing and Andy, 2010) and informational life (Nguyen et al. 2010) which are discussed below:

Informational life: Information communication technology and the Internet can offer benefits in addressing user's information needs (Nguyen et al. 2010). Mobile phone with advanced technology may be a general source of information. With the availability of mobile devices, it becomes easy to gain access to the tremendous amounts of information on the Internet anywhere and anytime. So, here we will observe whether mobile information services may contribute to user's informational life to improve the quality of life.

Educational life: Word translation anytime anywhere, reading E-books via mobile, etc., can improve the learning and teaching activities of mobile users. Choi et al. (2007b) did not get significant effect between the contribution of mobile data services to educational life and the contribution to overall. According to Dienerand Smith (1999) small but significant correlations between education and subjective well-being have often been found. It is to be expected that mobile information services may affect the young people's educational life to improve their overall quality of lives.

Trustworthy life: There are two main actors in trust: the trustor would be the user of mobile information services and the trustee which is the trusted party. In order to provide

personalized services, mobile services provider may need to locate users' position and collect users' profiles. Users may feel threatened when the technology has the capability to track users' actions and store personal information outside the users' control. Trust can help reduce the uncertainties a user faces when using mobile services. Thus, here we will observe whether trustworthiness from mobile service provider, can improve the quality of life of users.

Home-healthcare life: Home-healthcare life is the activities pertaining to do some self medical care activities in home through using advanced mobile technology without going to a hospital, doctor or clinic. Users require special health vigilance, including monitoring of their physical conditions (e.g. blood pressure, etc.) and the fulfillment of some medication agenda. For example, there are some fitness applications in smartphone that are mainly designed for the young generation with the specific focus on weight loss and diet management.

This study is interested in here to understand how mobile information services contributes to QoL than in how generally satisfied people are with their lives. As the use of the mobile phone blurred the boundary between home and work (Haddon, 1998), mobile information services can be used crossed time and place (Palen, 2002). Therefore, mobile information services have the potential to affect many life domains. Moreover, we did not know yet which domains were most relevant to mobile information services in different countries and different users. Therefore, our study has investigated the following life domains in table 8. Questions measuring mobile information services experience improvement contribution in the eleven life domains were based on mobile information services use experiences. The study used the formative indicators for mobile information

services Experience Satisfaction in accord with the theoretical foundation which requires highly specific events and experiences at the bottom level.

Table 8. Fifteen life domains and examples from interviews

Life Domain	Examples of QoL Perceptions of MIS Users			
	Need/goal	Context	Service	Examples from Interviews
Cultural	Enjoying movies	On the street	Movie information	"I use MIS to learn more about movies."
Leisure	Passing time	Alone	Mobile games	"I use mobile games when I don't have anything to do and there's nobody around."
Work	Doing office work	Outside the office	E-mail	"I use MIS to test new applications."
Educational	Studying	On the bus	Dictionary	"I use MIS to translate English words."
Health	Physical wellbeing	When I'm sick	Health information	"I use MIS to get medical information when a PC isn't available."
Financial	Checking bank accounts	When I'm out	Mobile banking	"I use MIS to check my bank account balance."
User	Consuming products/services	When I have to buy something urgently	Mobile shopping mall	"I use MIS to locate my sister when she doesn't answer the phone"
Family	Improving family ties	When family members are late	GPS	"I use MIS to locate my sister when she doesn't answer the phone"
Friend	Improving friendships	When I need to contact someone urgently	MMS	"I use MIS to check prices of something I need to buy."
Community	Improving relationships with community members	When I have an online community meeting	SMS	"I use MIS to let our members know our meeting schedule."
Self	Self-presentation	When I feel depressed	Share my own photo	"I use photo sharing to express my expression."
Informational	Get information	On the street	Weather information	"I use MIS to get information of news, weather, maps, etc."
Home-healthcare	Self-health care	When I am home	Diet or weight management application	"Using MIS in home for diet control and medication agenda."
Trustworthy	Feel secured to use MIS	Alone	Mobile payment or personalized mobile services	"I have trust on the Internet services by MIS."
safety	Confirming Security outside from home	On the street	Mobile search	"Searching for a safe route to my destination through the MIS late at night"

3.5.3 Bottom-up spillover theory

The bottom-up spillover theory (Andrews and Withey, 1976) is a model of the relationship between individual life domains and quality of overall life. The theory indicates that QoL in individual domains has spillover effects on overall QoL. In other words, happiness in subordinate individual life domains can spill over to produce superordinate overall happiness (Andrews and Withey, 1976). The bottom-up spillover theory has been concretized into the improvement hierarchy model. The premise of this model is that overall life improvement is functionally related to improvement within each of the individual life domains, which can be measured by improvement with specific events in each life domain (Sirgy, 2002).

3.5.4 Contribution to QoL

The basic premise of the bottom-up spillover theory is that improvement levels within individual life domains affect the overall level of life improvement (Sirgy, 2002). This relationship between Individual Contribution and Overall Contribution is displayed as our research model in figure 11. The bottom layer of our model represents the contribution of mobile information services to QoL in those domains (henceforth, Individual Contribution). The contribution of mobile information services to quality of individual life domains can be measured by the perceived contribution of specific use-experience of mobile information services in that domain. The top layer in our model represents the specific contribution of mobile information services to overall QoL (henceforth, Overall Contribution). Like Individual Contribution, Overall Contribution is conceptualized as the perceived contribution of mobile information services to overall QoL.

Past studies suggest that IT does have an influence on users' QoL. For example, Heijden's (2004) study of adoption behavior for hedonic systems implies that IT may have effects on leisure or culture life. Bhattacherjee's (2001) account of users' continuance behavior in online banking systems implies that such systems affect QoL in the domain of financial life. Choi et al. (2007a) measured the contribution of a mobile data service technology to the quality of users' lives. They have examined eleven individual life domains for Korean and Japanese respondents. Here we will try to examine fifteen life domains with our proposed four life domains.

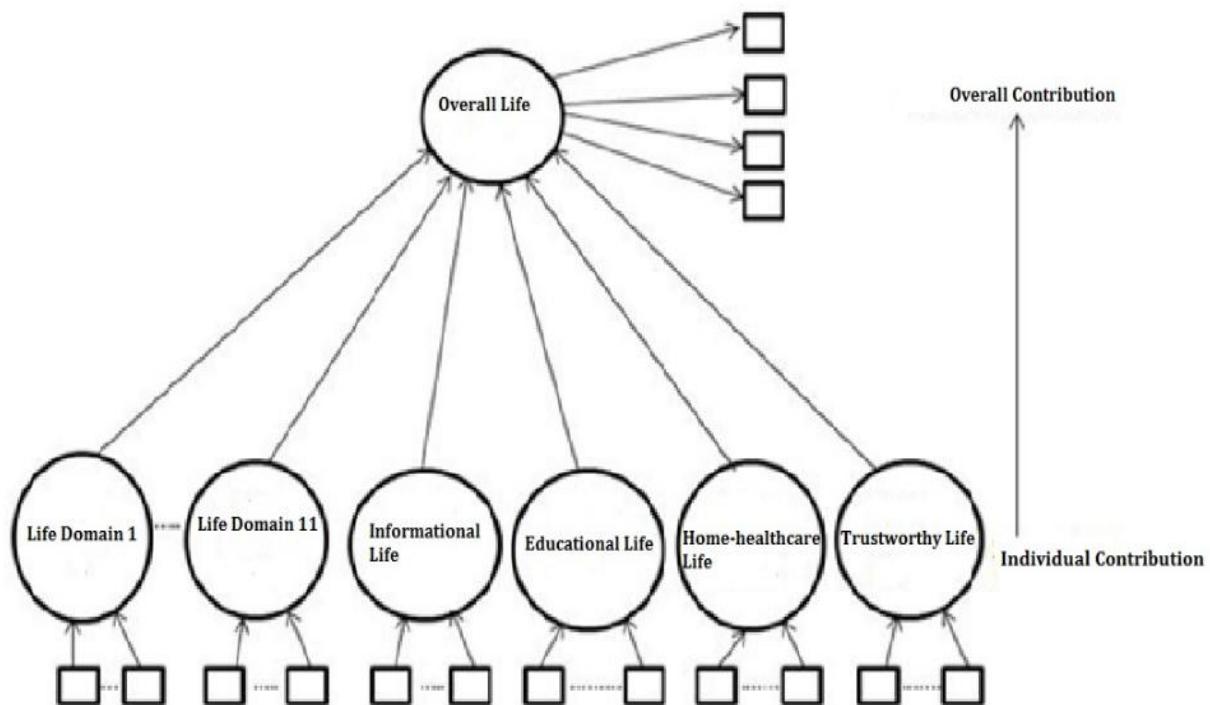
3.5.5 Theoretical Model and Hypothesis

We propose a theoretical model drawn from the bottom-up spillover theory. This study focuses on the contribution of mobile information services to QoL. The bottom layer of the satisfaction hierarchy model represents a person's satisfaction with events and experiences in various life domains. The corresponding layer in our model represents the satisfaction of mobile information services users with mobile information services experience (henceforth, mobile information services experience satisfaction) in various life domains. Within the leisure domain, for example, mobile information services experience satisfaction would include how satisfied a user is with the experience of playing mobile games while waiting on the street for a friend. While the middle layer of the satisfaction hierarchy model represents satisfaction within life domains, the corresponding layer of our model represents the contribution of mobile information services to QoL in those domains (henceforth, Domain-Specific Contribution of mobile information services to QoL). For example, this layer would include the contribution of mobile information services to quality of leisure life or user life. Finally, the top layer of the satisfaction hierarchy model

represents overall life satisfaction, and the corresponding layer in our model represents the contribution of mobile information services to overall QoL (henceforth, Overall Contribution of mobile information services to QoL). The bottom-up spillover theory also provides a framework for checking the nomological validity of our measures for mobile information services experience satisfaction, Domain Specific Contribution of mobile information services to QoL, and Overall Contribution of mobile information services to QoL. Because of the characteristics of mobile computing, mobile information services are likely to have effects in many life domains. Mobile information services users shopping on the mobile Internet can find products and services well suited to their needs (Ozen et al., 2004, Panatiotou and Samaras, 2004, Pashtan et al., 2004) more quickly and efficiently than they could otherwise. Satisfaction after using mobile information services may thus be higher than before use, and if so, mobile information services have affected QoL in the domain of user life. Mobile information services users may find hospital consultation hours, stock prices, or movie listings, or coordinate events in their lives with family, friends, or acquaintances (Sellen and Murphy, 2002). Thus mobile information services may affect QoL in the health and safety, financial, cultural, family, friend, social and other life domains. mobile information services also affect work life by allowing employees to communicate easily and effectively with others as they complete work-related tasks (Sirgy et al., 2006), so in this domain, too, mobile information services may affect QoL.

In sum, the activities mobile information services makes possible may enhance user QoL across a range of life domains. In the terms of this model, Experience Satisfaction with mobile information services in a given domain would increase the Domain-Specific Contribution of mobile information services to QoL. In other words, a user who has positive

experiences using mobile information services in a given life domain (mobile information services experience satisfaction) would have a higher QoL in that domain after using mobile information services (Domain-Specific Contribution of mobile information services to QoL) than before using them. This study measures concern spillover of contribution to QoL by mobile information services. Therefore, contributions of mobile information services to QoL within individual domains should affect the contribution of mobile information services to overall QoL. With the proposed four new life domains is displayed as the research model in figure 11. This study expect that improvement of QoL in each life domain (original and additional) after using mobile information services will positively influence overall QoL for young Japanese mobile users.



Source of life domains from 1-11: Choi et al. (2007)

Figure 11. Relationship between individual contribution and overall contribution with proposed life domains for mobile information services

3.6 Summary

The objective of this chapter was to develop study framework for the mobile user's usage behavior of mobile information services based on two outcome variables behavioural intention and QoL with the support of relevant literature. The study proposed several hypotheses to investigate the need structure, behavioural intention and QoL with respect to usage of mobile information services. The study then specified the nature of the research model to establish rigor in research methodology and empirical findings. Overall, the conceptual model of the study filled the gaps identified in Chapter 2 (Literature review) by proposing a TAM-TPB and bottom-up spillover hierarchy models. The study discusses research methodology in the next chapter to validate the proposed conceptual model with its hypothetical relationships.

Chapter Four

Methodology: Data and Instruments

4.1 Overview

This chapter specifies the data collection and instrument development of the study in estimating the research models for the interconnected research objectives based on covariance-based structure equation modeling (CB-SEM) and component-based structure equation modeling (PLS-SEM) structural analysis techniques. The research process was continued by collecting data from users of mobile services. The data was gathered with the help of four sequential surveys. The almost same measures were used in 1st, 2nd and 3rd themes except some constructs and measurement items for outcome construct behavioural interntion and different measures were used for outcome construct QoL. But the research models were evolved during research process and each theme analyzes the constructs relationship from a slightly different perspective. The empirical methods used in the thesis are summarized in below.

4.2 (1st Theme): Classify the Need structure of Mobile Information Services in Japan and the United States

4.2.1 Data Collection

I conducted two consecutive studies on Japanese customers in 2008 and 2009. In 2008, I conducted in-depth interviews with 30 mobile phone users who had adequate experience using mobile information services to explore their information needs and to identify the crucial factors that influence their mobile phone usage. On the basis of this qualitative

study, I developed an instrument for survey research. I employed a professional market research firm in Japan to collect data under a random sampling framework from a panel of mobile information service users between the ages of 16 and 79. Data were collected online in the period between September 18 and September 24, 2008. A questionnaire focusing on the use of information services via mobile phone was distributed to a randomly selected Internet research panel with a sample size of 20000. From this sample, 5567 effective responses (27.8% of the total sample) were obtained. Out of these 5567 effective responses, the number of people who had mobile phones was 5222, which amounted to 93.8% of the effective responses. 1707 effective responses for Japan 2008 were designated as the analytical subjects. The following 21 services were examined: mobile e-mail, SMS, MMS, TV phone, radio, Internet, 1-seg TV (mobile terrestrial digital audio/video and data broadcasting service), music, ring tones, video streaming, games, learning (dictionary, translation services, and encyclopedia), health, Infotainment content (movies, nightclubs, and celebrity gossip), mobile chat (push to talk), stock trading, shopping services, coupon and advertising information services, online storage services (Internet data storage services), reservation or booking (hotel rooms or airline seats), and location-based services (GPS or maps).

In 2009, an Internet research panel with a sample size of 3500 was randomly selected from the original 5222 respondents. Data were collected online during the period between July 10 and July 14. I obtained 1686 effective responses (32.2% of the sample). For a two-year comparative study, a sample of 1686 effective responses from Japanese users was compiled. This sample consisted of the same people who responded in both 2008 and 2009; these respondents were designated as our analysis subjects. In 2009, an Internet

study was conducted with a sample size of 499 students from a university in California in the United States. Out of the 499 respondents, 389 were in their 20's. For a comparative study of young people in their 20's between Japan and the United States, I had an effective sample of 169 out of 1686 respondents from Japan and a sample of 389 students from UCLA. These respondents comprised our final set of sample data in Table 9.

Table 9. Demographics of respondents for 1st theme

Japan 2008 and 2009 (National level)			
	Subject	Japan 2008	Japan 2009
Age	16-79 years old	1707	1686
Japan 2009 and USA 2009 (Student)			
	Subject	USA 2009	Japan 2009
Age	20-29 years old	389	169

4.2.1 Instrument: Factor Analysis Based on Use Intention Data

Measurement

Aaker and Alvarez (2009) have indicated that brand awareness indirectly affects purchase behavior. Likewise, an awareness of newly emerging services will affect purchase behavior and the behavioural intention these services. Therefore, this was a good place to begin extracting factors based on continued use intention. I conducted a factor analysis on 1707 respondents from the 2008 data and 1686 respondents from the 2009 data to extract common factors that exist among similar services in terms of the use intention of the 21 mobile information services. The following is a summary of the measurement: The phrase, "Please rate your behavioural intention to use the following mobile information service on a continuous basis or in the future" was used to operationalize use intention. A five-point Likert-type scale was anchored by low/high use intention for the 21 mobile services. The

study screens those respondents who have used mobile information services at least once in the last one year.

4.3 (2nd Theme): Behavioural Intention to Use Mobile Entertainment Services among Bangladeshi Student

4.3.1 Data Collection

Five surveys were conducted at five universities in Dhaka, Bangladesh, from June to August 2014. These participants lived in Dhaka, the south-central part of Bangladesh where mobile services are the most accessible. One hundred and thirty-five mobile phone users at one private university and an additional 40 and 50 users at two other private universities were invited to participate. Two further surveys were conducted at two public universities involving 68 mobile phone users at one campus and 33 users at the other. In total, 326 subjects received the questionnaires, producing 276 completed responses.

I used responses from those 18 to 30 years old for this research since youth is the lead segment in adopting mobile entertainment (Andreaou et al. 2002). I also used responses from experienced mobile device users, following the view of Kondo and Ishida (2014) that experience is required to form opinions. Kondo and Ishida (2014) eliminated non-mature cell phone users in order to eliminate the strong influence of IT dexterity in their research. I also eliminated non-users and non-mature cell phone users. These eliminations led to 251 respondents for analysis. The awareness of mobile entertainment services by users will indicate their future intention to use these services. The participants in this study answered that they were well familiar with entertainment services as follows: game (45.82%), music (65.74%) and ringtones (41.83%). We observed that the penetration rates are not high enough where this study has a room to be carried out.

Demographic values are comparable to those in Kondo and Ishida (2014): the percentage of 20–25 age group were 66.1% for Japan and 73.7% for the US in their study and I' 80.9% for Bangladesh; that of males were 66.9% for Japan and 70.1% for the US in their study and I' 65% for Bangladesh; that of mature users of more than 5 years were 71.9% for Japan and 76.4% for the US in their study and I' 67.9% for Bangladesh.

Table 10 shows the descriptive statistics of the respondents based on the questions as follows: Q1. How many years have passed since you started to use the first cell phone? Q2. What category (or type) of program are you using? Q3. Are you well familiar with the game, music and ringtone services provided by your mobile carrier?

Table 10. Demographics of Respondents to questions, Q1 – Q3 (2nd theme)

Category	Values	Bangladesh	
		N=251	(%)
Age	19 years old or younger	35	13.9
	20-25 years old	203	80.9
	26-30 years old	13	5.2
Gender	Male	163	65
	Female	88	35
Q1	less than 6 months	N/A	N/A
	6 months - less than 1 year	1	0.4
	1 year - less than 2 years	12	4.8
	2 years - less than 3 years	20	7.9
	3 years - less than 5 years	48	19.1
	5 years - less than 10 years	142	56.6
Q2	10 years or more	28	11.2
	Pre-paid (you purchase calling cards)	237	94.5
	Monthly billing (based on contract with your provider)	14	5.5
Q3	Game	115	45.8
	Music	165	65.7
	Ringtone	105	41.8

Our demographic values are compatible to Kondo and Ishida (2014). They had 66.1% (Japan) and 73.7% (USA) respondents of age group 20-25. I have 80.9% for Bangladesh. For male group, they had 66.9% for Japan and 70.1% for USA. I have 65% for Bangladesh. About mature users of more than 5 years, they had 71.9% for Japan and 76.4% for USA. I have 67.9% for Bangladesh. The well awareness ration about mobile game, music and ringtone services are almost similar for Bangladesh 2014 sample as it was for Kondo and Ishida's (2014) Japan 2009 data set (see table 11). So, this can assume that mobile entertainment market in 2014 can be in same situation as Japan was in 2009.

Table 11. Well awareness ratio between Japan 2009 and Bangladesh 2014 for mobile game, music and ringtone services

Service Category	Japan 2009	Bangladesh 2014
game	40.9%	45.8%
music	47.5%	65.7%
ringtone	42.9%	41.8%

The initial survey items of this study are shown in the appendix 1. These items were adapted from Kondo and Ishida (2014), Okazaki et al. (2008) and Boontarig et al. (2012). I used the following sets in 5-, 7- and 10-point Likert scales: 'strongly disagree'/'strongly agree'; 'unfair'/'fair'; 'very low'/'very high'; 'definitely won't'/ 'definitely will'. I used the items in Kondo and Ishida (2014) while adding a question on perceived value drawn from Boontaring et al. (2012) to their two questions on perceived value and attitude: 'mobile entertainment services (games, music, ringtones) have an acceptable standard of quality'. I also added one question on attitude drawn from Celik and Yilmaz (2011): 'Using mobile entertainment services (games, music, and ringtones) services are beneficial to me'. The constructs name, item, type and source have shown in appendix 1.

4.4 (3rd Theme): Behavioural Intention to Use Mobile Entertainment Services among Young Users in Japan and Bangladesh: Comparative Cross-country and Cross-temporal Studies

4.4.1 Data Collection

Two surveys were conducted in Japan of 214 mobile phone users at a university in Ibaraki and 66 users at a university in Tokyo. An online questionnaire was distributed. The Japanese surveys were conducted in Ibaraki and Tokyo in November, 2009 and in Ibaraki from August to October, 2014. Valid responses were received from 173 individuals in 2014 and 242 respondents in Japan in 2009.

Five surveys were conducted in faculty of Business Administration from five universities in Dhaka, Bangladesh in the period of June-August, 2014. Individual mobile phone users from three different private universities were invited to participate and 135, 40 and 50 responses were obtained, respectively. In addition, two surveys were conducted in two public universities, resulting in 68 and 33 responses from mobile phone users, respectively. In total, 326 subjects received the questionnaires, resulting in 276 completed responses.

We used responses from young users who were 18-30 years for this research as it has been found that the youth is the lead segment in adopting mobile entertainment (Andreou et al. 2002). We also used responses from experienced mobile device users, following the approach of Kondo and Ishida (2014) in which experience is required to form opinions. They eliminated non-mature cell phone users in order to eliminate the strong influence of IT dexterity in their research. We also eliminated 2 responses from the data set, which were from non-user and non-mature (less than 6 months) cell phone users. Therefore, after

the elimination, in table 12 there were 251 respondents for Bangladesh in 2014, 173 for Japan in 2014 and 242 for Japan in 2009.

Table 12. Demographics of Respondents to Q1: How many years have passed since you started to use your first cell phone?

Category	Values	Bangladesh 2014		Japan 2009		Japan 2014	
		N=251	(%)	N=242	(%)	N=173	(%)
Age	19 years old or younger	35	13.9	40	17	80	46
	20-25 years old	203	80.9	160	66	93	54
	26-30 years old	13	5.2	12	5	N/A	N/A
	No answer	N/A	N/A	30	12	N/A	N/A
Gender	Male	163	65	162	67	143	83
	Female	88	35	80	33	36	21
Q1	6 months - less than 1 year	1	0.4	1	0	1	1
	1 year - less than 2 years	12	4.8	4	2	7	4
	2 years - less than 3 years	20	7.9	6	2	5	3
	3 years - less than 5 years	48	19.1	57	24	51	29
	5 years - less than 10 years	142	56.6	158	65	100	58
	10 years or more	28	11.2	16	7	9	5

The initial survey items have shown in appendix 1. These items were adapted from previous studies, Kondo and Ishida (2014). We used the following sets of 5 and 10 point likert scales: Strongly disagree/strongly agree; unfair/fair; very low/ very high; definitely won't/ definitely will.

4.5 (4th Objective): The Contribution of Mobile Information Services to Fulfill User's Needs by Improving their Quality of Life in Japan

4.5.1 Data

A survey was conducted in Japan of 245 mobile phone users at a university in Ibaraki. An online questionnaire was distributed. The Japanese survey was conducted in Ibaraki at Feb, 2013. We used responses from users who were 19-39 years for this research. Major respondents were young adults as it has been found that the mobile phone has become a key information technology for youth (de Chenecey, 2002). Our participants are the Japanese young users of mobile information services via mobile phone with Internet convergence. For having Internet in mobile phone, most of the users have smartphone. So, the sample in our research contains mostly smart phone users. We eliminated some responses which had missing values. Therefore, after the elimination, there were 189 respondents to do the analysis for Japan 2013 (see table 13).

Questions measuring Individual Contribution in the fifteen life domains were based on the mobile information services use experiences. Our initial survey items for eleven original life domains were adapted from Choi et al. (2007a). The items of our additional four life domains were adopted from Andrews and Withey (1976), Jing and Andy (2010) and Nguyen et al. (2010). We chose to use the formative indicators elicited in order to reflect concrete use experiences with mobile information services because our theoretical foundation, the Bottom-up Spillover Theory, required highly specific events and experiences at the bottom of the improvement hierarchy model. Subjects were asked to rate how much they agree that each specific experience of using mobile information services contributes to the QoL in the corresponding individual life domains. We

constructed questions measuring Overall Contribution of mobile information services to QoL as reflective indicators based on the Improvement with Life Scale (SWLS), which is one of the most widely used scales in QoL research, with high internal consistency and test-retest reliability (Pavot and Diener, 1993). We used the following sets of 7-point Likert scales: Strongly disagree/strongly agree for individual and overall contribution. The survey questions are shown in Appendix 2.

Table 13. Demographics of Respondents for Japan 2013

Category	Values	Japan 2013	In %
Gender	Male	137	72%
	Female	52	28%
Age	19 years old or younger	32	17%
	20-29 years old	151	80%
	30-39 years old	6	3%

4.6 Summary

This chapter specifies the data collection, data analysis technique and instrument development of the study in estimating the research models for the interconnected research objectives based on covariance-based SEM (CBSEM) component-based SEM (PLS) structural analysis techniques. In the next chapter (Chapter five), the study discusses in detail factor analysis, CB and PLS path modeling will be applied to estimate the needs structure, TAM-TPB and bottom-up spillover hierarchy models.

Chapter Five

Analysis and Results

5.1 Overview

The objective of this chapter is to present empirical findings of the study. Specifically, the chapter provides findings on the measurement model, structural model and extended model with the effects of control variables. As discussed in Chapter 4, this study applied factor analysis, CB-SEM and PLS-SEM path modeling by using the mobile usage responses. The study applied SPSS, AMOS 22.0 and SMART PLS 2.0 to estimate parameters of the models. The study presents findings with results of hypotheses testing in terms of the usage needs of the mobile information services, behavioural intention to use mobile information services and how mobile information services are fulfilling user needs in life (QoL).

5.2 (1st Theme): Classify the Need structure of Mobile Information Services in Japan and USA

5.2.1 Analysis and Findings: Factor Analysis on Japanese Use Intention Data over Two-Year Period

In order to focus on the needs of the present and potential customers, I analyzed only continuous use intention. For this comparative two-year period, 1707 effective responses for Japan 2008 and 1686 effective respondents for Japan 2009 were designated as the analytical subjects. I conducted a factor analysis to extract common factors that existed among similar information services in terms of the use intention of the 21 mobile

information services. The factor analysis was conducted on the basis of the use intention by the principal factor method using varimax rotation. Ghyas et al. (2011) identified four dimensions of mobile services: information intensiveness, amusement, and service penetration rate, on the basis of the data of use intention of 21 information services. There was no change between 2008 and 2009 in the services affected by these factors except for—radio (because of a missing value). Table 14 summarizes the factor loadings for each service in the case of each factor. The differences between the two years were due to a number of missing values. The results showed that in both 2008 and 2009, four factors were confirmed to be the primary factors affecting the mobile information service needs in Japan. These four factors were as follows: Factor 1: information intensiveness; Factor 2: entertainment; Factor 3: low penetration service; and Factor 4: communication service.

Factor 1 refers to services that require a high degree of information, such as making a reservation or stock trading. Factor 2 represents services with entertainment characteristics, such as ring tones. Factor 3 represents services with low penetration characteristics where the use ratio is low, such as a TV phone. Factor 4 represents services having communication tool characteristics, such as SMS, email, and MMS, i.e., e-mail with pictures. Services within the factor are listed as follows:

Factor 1: radio, the Internet, learning, health, infotainment content, stock trading, shopping services, coupon and advertising information services, online storage services, reservation or booking, and location-based services;

Factor 2: 1-seg TV, music, ring tones, video streaming, and games;

Factor 3: TV phone and mobile chat;

Factor 4: Mobile e-mail, SMS, and MMS.

TABLE 14. Factor loadings and user ration for each services in Japan 2008 and 2009

Service Items	2008				2009				User Ratio in %
	1	2	3	4	1	2	3	4	
Reservation or booking	0.793	0.16	0.136	0.17	0.775	0.189	0.211	0.162	45
Shopping services	0.739	0.291	0.163	0.098	0.712	0.302	0.241	0.076	47.9
Coupon advertisement	0.62	0.312	0.09	0.243	0.602	0.35	0.099	0.228	59.8
Online storage service	0.617	0.272	0.419	0.088	0.551	0.258	0.5	0.084	24.4
Health	0.613	0.398	0.317	0.054	0.534	0.394	0.437	0.072	39.5
Learning	0.594	0.416	0.179	0.134	0.532	0.442	0.243	0.167	53.80
Location based services	0.59	0.255	0.154	0.206	0.634	0.284	0.205	0.175	48.7
Internet	0.587	0.428	-0.035	0.229	0.574	0.408	0.038	0.205	84.5
Infotainment content	0.56	0.498	0.275	0.108	0.539	0.472	0.374	0.15	50.9
Stock trading	0.501	0.122	0.343	-0.024	0.542	0.099	0.388	-0.045	29.7
Radio	0.417	0.33	0.255	0.13	0.266	0.35	0.397	0.14	37.5
Ringtones	0.198	0.743	0.136	0.257	0.21	0.724	0.17	0.233	67
Music	0.375	0.714	0.117	0.157	0.297	0.748	0.205	0.164	58.3
Video streaming	0.379	0.678	0.26	0.179	0.36	0.682	0.314	0.19	50.8
Games	0.308	0.568	0.225	0.119	0.371	0.514	0.248	0.125	57.2
1-seg TV	0.284	0.495	0.187	0.197	0.269	0.498	0.174	0.174	46.5
Mobile chat	0.338	0.296	0.754	0.07	0.308	0.267	0.774	0.039	17.7
TV phone	0.254	0.356	0.476	0.297	0.217	0.311	0.506	0.279	35.4
MMS	0.092	0.261	0.158	0.719	0.095	0.258	0.159	0.7	84.7
Mobile email	0.13	0.144	-0.147	0.615	0.143	0.118	-0.149	0.643	97
SMS	0.085	0.049	0.136	0.449	0.062	0.077	0.193	0.451	80.3

(A) Year 2008: 1707 respondents; age group: 16~79

(B) Year 2009: 1686 respondents; age group: 16~79

5.2.2 Analysis and Findings: Comparative Factor Analysis Based on Use

Intention Data of Japan and United States

In order to focus on the needs of both present and potential customers, I analyzed only the use intention. For this comparative research of young people in Japan (169) and the United States (389), effective responses were designated as the analytical subjects. I

conducted a factor analysis to extract common factors that exist among similar information services in terms of the use intention of the 20 mobile information services, excluding 1-seg TV, which does not exist in the United States. I used factor analysis as the statistical technique to analyze the data. I examined the data to check for inconsistencies due to random error by running a reliability test, ensuring that the integrity of the data was at a manageable level. Table 16 shows that the overall factor analysis was significant for Japan as the Kaiser-Meyer-Olkin statistics were greater than 0.50 and the chi square statistics were significant with a probability of less than 0.05 (Malhotra, 2004). In the case of USA (Table 16), the overall factor analysis was not significant because there was a considerable amount of missing data from the Internet questionnaire, and hence, I ran the factor analysis without including the Internet data. Without the Internet data, the chi square statistics became significant, as shown in Table 16. I conducted a factor analysis on the 20 mobile information services by further excluding Internet data and extracted four factors that explained the 68.23% cumulative variance for Japan and three factors that explained the 57.6% cumulative variance for UCLA (Eigen values greater than 1 are shown in Table 17. The cronbach α coefficient, the reliability coefficient of the measured value of questionnaire items for each construct from the point of view of internal consistency, is used for verifying whether each item had common parts for the same factor. If the value of this coefficient was 0.7 or more, the internal consistency of the measurement scale was considered to be high and the reliabilities were adequate. The coefficients for each factor are shown in Table 15. Since all values exceeded 0.7, it was concluded that the items of each information service of these factors had common parts. I extracted four factors from 20 information services. There was no change in the first two factors between UCLA and Japan, except for

some services belonging to the communication factor. In Table 18, the factor structure is presented on the basis of the identification of items that have loadings on the same factor, with a factor loading greater than 0.4. The service item Internet (for the United States) did not satisfy the abovementioned requirement and hence was omitted. For UCLA and Japan, the same items that significantly loaded on the first factor were reservations and booking, coupon advertisements, Internet storage services, shopping services, stock trading, learning, and location-based services. These six items represented the information services that customers could access by using a mobile device. Therefore, this factor was referred to as a mobile information-intensive service. Reservations and booking and coupon advertisements were very significant in the information-intensive service for both countries. The most information-intensive service items were loaded on the same factor; this implied that the service structure for an information-intensive service was same between the United States and Japan.

The common items for the United States and Japan that were loaded as the second factor were music, games, ring tones, and video streaming. All of these items had an entertainment factor. These items indicated that customers prefer to be entertained by their mobile devices. Therefore, this factor could be named entertainment. Users in both countries were always satisfied by mobile entertainment services that enabled them to listen to music and download ring tones on their mobile phones. There existed an entertainment factor for both counties, and the entertainment service items were loaded on the same factor except for some items.

I could interpret this as the existence of a same structure of the entertainment factor with slight differences in its members. In Table 18, the order of the third and fourth factors

was different for the United States and Japan. The identified items (for the United States and Japan) of the last two factors were fewer than those of the first two factors. Therefore, they were relatively old services and did not explain data variability well as compared to the first two factors. For the United States, the third factor consisted of two items, SMS and MMS, which facilitate basic communication; hence, this factor was named communication services. For Japan, factor 3 represented services with low penetration characteristics where the loading value was low. The third factor consisted of mobile chat and TV phones. These were classified as the low penetration factor, which specified advanced communication tools. The fourth factor was composed of MMS, mobile e-mail, and SMS, all of which facilitated basic communication. We found that the service structure for communication was different between the United States and Japan.

For the large sample size of 1854 for 2008 and 2009 in Japan and the medium sample size of 389 for UCLA, health and learning were loaded in the first factor, which was an information-intensive factor. Because of the small sample size of 169 for Japan, the first factor and the second factor for the services of learning and health could not be easily differentiated. They were very close and had little influence on the entertainment factor. In table 18, I concluded that a factor in TV phones was less assertive in Japan. Infotainment content was loaded in the entertainment factor for Japan and in the information-intensive factor for the United States.

TABLE 15. Reliability Statistics for Japan 2009 and USA 2009 (Without Internet)

Mobile service category	Japan 2009		USA 2009	
	No. of items	cronbach α	No. of items	cronbach α
Information-intensive	8	0.898	10	0.930
Entertainment	7	0.913	7	0.883
Low penetration rate	2	0.774	-	-
Communication tools	3	0.654	2	0.642

TABLE 16. KMO and Bratlett's Test and Total Variance Explained for Japan 2009, USA 2009 and USA 2009 (excluded Internet)

		Japan 2009	USA 2009	USA 2009 (excluded Internet)
KMO measure		0.912	0.905	0.906
Bratlett's Test	Approx. Chi-square	2085.6	60.4	1246.1
	Df	190	190	171
	Sig.	0.00	1.0	0.00

TABLE 17. Total Variance Explained for Japan 2009 and USA 2009 (excluded Internet)

Factor	Japan 2009			USA 2009 (excluded Internet)		
	Rotation sum of squared loadings			Rotation sum of squared loadings		
	Total	% variance	Cumulative %	Total	% variance	Cumulative %
Information-Intensive	9.379	46.896	46.896	7.108	37.409	37.409
Entertainment	1.936	9.682	56.578	2.505	13.183	50.592
Low penetration	1.255	6.276	62.854	-	-	-
Communication	1.076	5.380	68.234	1.330	6.998	57.590

TABLE 17. Factor Loadings of Each Mobile Service: Comparison between United States 2009 and Japan 2009

Service Items	Japan (169)				UCLA (389)		
	1	2	3	4	1	2	3
Reservation or booking	0.813	0.169	0.294	0.083	0.823	0.133	0.021
Location based services	0.704	0.29	0.148	0.122	0.391	0.366	0.29
Shopping services	0.657	0.302	0.276	0.018	0.737	0.236	0.044
Stock trading	0.62	0.168	0.52	-0.06	0.667	0.196	-0.156
Online storage service	0.586	0.316	0.557	0.068	0.761	0.126	-0.036
Coupon advertisement	0.556	0.312	0.087	0.113	0.796	0.041	0.037
Internet	0.504	0.387	-0.079	0.288	N/A	N/A	N/A
radio	0.44	0.252	0.396	0.126	0.286	0.585	-0.041
Ringtones	0.144	0.735	0.167	0.217	0.074	0.574	0.103
Video streaming	0.318	0.694	0.284	0.225	0.353	0.659	0.076
music	0.423	0.661	0.164	0.218	0.134	0.723	0.185
Infotainment content	0.508	0.596	0.373	0.059	0.69	0.213	0.022
Games	0.366	0.536	0.207	0.082	0.139	0.699	0.137
Learning	0.519	0.522	0.184	0.067	0.566	0.329	0.114
Health	0.472	0.516	0.365	0.021	0.71	0.273	-0.034
Mobile chat	0.324	0.276	0.842	0.04	0.495	0.332	0.063
TV phone	0.209	0.389	0.49	0.128	0.345	0.512	-0.058
MMS	0.075	0.219	0.106	0.762	-0.02	0.226	0.481
Mobile email	0.184	0.041	-0.0317	0.605	0.159	0.543	0.33
SMS	-0.016	0.093	0.173	0.505	-0.057	0.45	0.821

A) USA (UCLA): 19 items; 389 respondents

B) Japan: 20 items; 169 respondents

5.2.3 Findings: Cultural and Technological Differences in Mobile Information Services between Japan and the United States

I identified four dimensions of need determinants for Japan and the United States: the information-intensive dimension, the entertainment dimension, the communication dimension, and the service penetration rate (advanced communication) dimension. Each factor was very closely related to the device generation, 1G or 2G (communication), 3G

(entertainment), and 3G or 4G (information intensive). Therefore, I could conclude that our measurements were generally appropriate for extracting factors with respect to the need for mobile information services in technologically advanced countries. These results might be considered reliable largely because of the consistency of the sample questions.

The dimension of the service penetration rate was related to services with advanced technology, and there would not be many people who experienced using certain services. The dimension of information-intensive services had the largest variability. This might be due to the fact that this dimension was specific to customers who were interested in the specific services and would require appropriate segmentation identifying the relationship between the interests in the service and the characteristics of the customers. From the comparative study, I found that the service structure for the information service was same and the service structure for the entertainment service was roughly same in the case of both the United States and Japan. However, the scenario for service with communication factors appeared to be due to the cultural differences between the United States and Japan. Japan is more advanced than the United States in the use of communication tools. Daily life in Japan is not conceivable without an Internet connection. Mobile users in Japan were the most connected, with more than 75% using connected media (browsed the Internet, accessed applications, or downloaded content) in June 2010 as compared to 43.7% in the United States. Japanese mobile users also displayed the highest usage of both applications and browsers, with 59.3% of the entire mobile population accessing their browsers in June 2010, and 42.3% accessing applications. Comparatively, 34.0% of the mobile users in the United States used their mobile browsers, and 31.1% accessed applications. The use of messaging methods also varied. The United States had the highest use of text messaging,

with 66.8% sending a text message in June 2010 compared with just 40.1% in Japan. Japanese users exhibited the highest reach in the e-mail category at 57.10%, while users in the United States were using e-mail on their mobile phones at 30.50%. Mobile operators in developed countries could begin to lose money in the next two to four years if they do not change their business models (Tellabs news, 2011). In this competitive mobile market, companies need to come up with innovative ideas and implement them around the world.

5.3 (2nd Theme): Behavioural Intention to Use Mobile Entertainment Services among Bangladeshi Student

5.3.1 Measurement Scales

In order to assess the reliability and validity of the constructs, several measures were computed. The reliability coefficient, composite reliability (CR), average variance extracted (AVE) and the squared inter-correlations (SIC) are reported for Bangladesh in table 19. The Cronbach α Coefficient is the measured value of questionnaire items for each construct from the point of view of internal consistency. If the value of this coefficient was 0.7 or more, the internal consistency of the measurement scale is considered as being high and the reliabilities are adequate. The coefficients for each factor are shown in table 19. Since all values exceeded 0.7, it was concluded that the items of these constructs had common parts. The threshold for CR is 0.70 or higher (Bagozzi and Yi, 2011). All AVE values were above 0.5 indicating convergent validity. For discriminant validity, the AVE of each construct should exceed the SIC of the construct with other constructs. As shown in the table 19, this holds true for all constructs.

Table 19. CR, AVE, and SIC for Each Construct for Bangladesh 2014

Constructs	Items no.	CR	AVE	1	2	3	4	5	6	7	8
				AVE and SIC							
ATT	3	0.805	0.580	0.580							
PV	3	0.721	0.60	0.090	0.600						
PF	3	0.870	0.700	0.178	0.126	0.700					
PEOU	3	0.865	0.684	0.287	0.070	0.203	0.684				
PC	2	0.781	0.650	0.159	0.152	0.640	0.252	0.650			
BI	3	0.81	0.588	0.108	0.100	0.341	0.194	0.341	0.588		
SN	3	0.758	0.626	0.374	0.061	0.106	0.115	0.116	0.049	0.626	
PBC	3	0.770	0.533	0.252	0.048	0.063	0.069	0.068	0.011	0.51	0.533

Note: The values of AVE are on the diagonal and those of SIC on the off-diagonal.

5.3.2 Analytical Method

The research models were analyzed for Bangladesh via structural equation modeling (SEM) by using the statistical software AMOS version 22.0. The SEM is a statistical approach to understanding social and natural phenomena by identifying a causal relationship between the observed variables and the latent variables that cannot be observed directly. A useful and powerful aspect of SEM is the test of hypotheses across samples (Bagozzi and Yi, 2011).

Based on fit indices, the best was obtained. the classification of these model fit indices as roughly two types, absolute fit indices and comparative fit indices summarized by Hooper et al. (2008). The absolute fit indices include goodness-of-fit (GFI), adjusted goodness-of-fit (AGFI) and root mean square error of approximation (RMSEA). The comparative fit indices include Akaike Information Criterion (AIC), Browne-Cudeck Criterion (BCC), Normed Fit Index (NFI) and Tucker-Lewis Index (TLI). Threshold guidelines exist for these indices. The overall fit indices of the revised models were examined. A *t*-value was used as a criterion to

test the significance of the parameters at the .05 level. A *t*-value was defined as the ratio between the parameter estimate and its standard error (Joreskog and Sorbom, 1989).

5.3.3 Results

I have conducted four TAM-TPB models in order to establish the best-fit index. The four TAM-TPB models are as follows: The research model in Figure 10 was Model 1. Model 2, 3 4 and 5 were created by using a step-by-step approach. Model 1 is the hypothesized model with all constructs and paths. Model 2 was created by deleting the non-significant path from perceived convenience to attitude from the hypothesized model 1. Model 3 was created by deleting the non-significant path from perceived fun to attitude in model 2 to make better fit measures. Model 4 was created by deleting the non-significant path from subjective norm to behavioral intention in Model 3. Model 5 was created by deleting the non-significant path from Perceived behavioural control to behavioral intention in Model 4. Table 3 shows the fit measures for the four models for Bangladesh data. All fit indices are in the acceptable range for model 5. These results indicate that Model 5 has the smallest AIC value (132.18) and has the information criterion with the most significant estimated coefficients. Therefore, it was selected as the best model. The values for GFI (0.947) and AGFI (0.914) exceeded 0.9 and are thus in the acceptable range. The RMSEA is 0.049, which is less than 0.05 and thus considered to be a good fit (Tsang et al. 2004). Table 20 shows that the goodness of fit of generated or re-specified models are better compared to the hypothesized model. In summary, generated values for model 5 are superior to those for the other models.

Table 20. Values of Model Selection Criteria on Each Model for Bangladesh 2014

	GFI	AGFI	RMSEA	CFI	AIC	BCC
Model 1 (hypothesized model)	0.774	0.718	0.112	0.770	1008.2	1023.9
Model 2 (excluded PC->ATT and PEOU->PC)	0.804	0.749	0.109	0.798	737.8	749.6
Model 3 (excluded PF->ATT and PEOU->PF)	0.877	0.825	0.107	0.853	357.8	363.8
Model 4 (excluded SN->BI)	0.947	0.913	0.050	0.973	133.1	137.0
Model 5 (excluded PBC->BI)	0.947	0.914	0.049	0.973	132.1	135.9

Since the hypothesized model (Figure 10) did not achieve model fit, the explanation of hypotheses result is based on generated or re-specified model 5. Model 5 shows the highest applicability and well fitting for Bangladesh among all models in this research. The final model for Bangladesh is shown in Figure 12. The coefficients of the measurement variables that explain the latent variables are all significant at the level of 0.1% or less. Therefore, the measurement variables generally appear to explain the latent variables well. Hypotheses H1 and H4 - H7 in model 5 were supported in our analysis for Bangladesh in table 21.

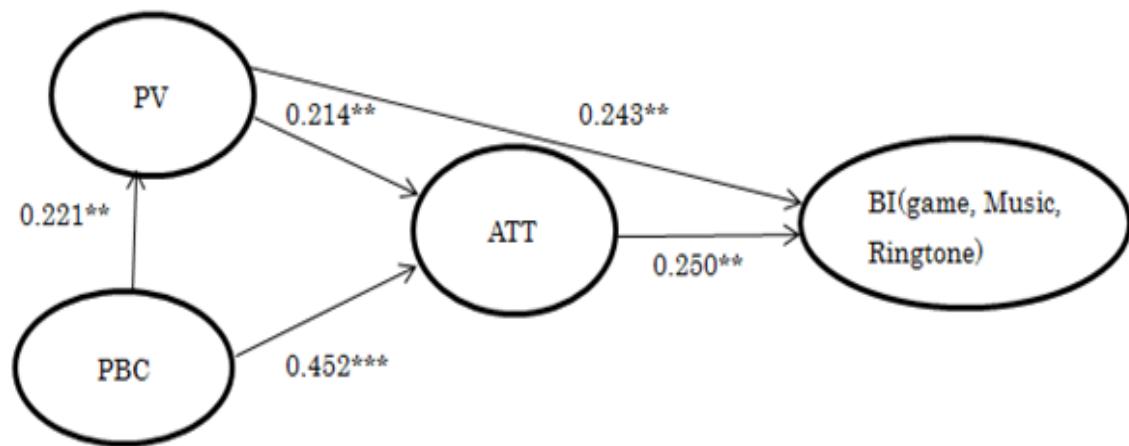
H1: Mobile users' Attitude towards mobile entertainment services has a direct positive impact on their intention to use mobile entertainment, with a standardized estimate of 0.250; the hypothesis is accepted.

H4: Mobile users' perceived behaviour control towards mobile entertainment services has a highly positive impact on their attitude to using mobile entertainment services, with a standardized estimate of 0.452; the hypothesis is accepted.

H5: Mobile users' Perceived behavioural control towards mobile entertainment services has a direct positive impact on their perceived value of using mobile entertainment services, with a standardized estimate of 0.221; the hypothesis is accepted.

H6: Mobile users' perceived value towards mobile entertainment services has a positive impact on their attitude to using mobile entertainment services, with a standardized estimate of 0.214; the hypothesis is accepted.

H7: Mobile users' perceived value towards mobile entertainment services has a positive impact on their behavioural intention to use mobile entertainment services, with a standardized estimate of 0.243; the hypothesis is accepted.



Note: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.1$.

Figure 12. Path Analysis of Model 5 for Bangladesh at significance level

Table 21. Standardized Estimates on Model 5 for Bangladesh 2014

Hypotheses	Paths	Standardized Estimate	S.E.	t- value
H1	Attitude → Behavioural Intention	0.250**	0.136	2.904
H4	Perceived Behavioural Control → Attitude	0.452***	0.088	5.105
H5	Perceived Behavioural Control → Perceived Value	0.221**	0.227	2.619
H6	Perceived Value → Attitude	0.214**	0.029	2.714
H7	Perceived value → Behavioural Intention	0.243**	0.050	2.820

Note: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.1$.

Our hypothesized Model 1 with additional constructs: perceived fun, and perceived ease of use did not show a good model fit. Research has suggested that perceived enjoyment does not positively influence behaviour to use a technology system (Fagan et al., 2008; Shin and Kim, 2008). This appears to be the case for Model 1.

We observed from our result that perceived behavioral control, perceived value and attitude are positively significant determinants on behavioural intention. We got positive significant values of standardized estimate for the dependent and independent variables. The result shows that behavioral control concerning mobile entertainment services is a very important driver of attitude. Then Attitude has strong positive indicator for behavioral intention. We can state that attitude and perceived value is important indicator for behavioral intention. Also, Perceived behavioral control is a good determinant of perceived value and perceived value has moderate influence on attitude.

The results of Model 5 are generally compatible with those on mobile entertainment services reported in Kondo and Ishida (2014) as well as those on gaming services reported in Nysveen et al. (2005) concerning Norwegian customers. Our data cover 2014, while Kondo and Ishida (2014) used Japanese and US data from 2009. Despite the time difference, the results seem similar because Bangladesh in 2014 was at the same stage of 3G mobile service provision the US and Japan were in 2009. The results indicate that the TAM-TPB model can be applied in both developed and developing countries after adjustments for technology diffusion timing are made.

5.3.4 Findings

This study represents an attempt to explain mobile ringtone, music and gaming adoption in Bangladesh context. Despite increasing empirical research, there is a serious lack of

studies that examine specific mobile entertainment service applications in Bangladesh. Our study serves as one of the good attempts in this area. The study conducted the survey based on the modified TAM-TPB model captures relevant antecedents of the attitude-intention chain for Bangladeshi young. The result provides good fit and significantly positive results for the model with four constructs: Behavioral control, perceived value, attitude, and behavioral behavioural intention mobile services. The estimated coefficients shows that the generated model fits generally well with the data for Bangladesh. The outcomes from this study revealed that the TAM-TPB model with attitude, perceived behavioral control and perceived Value could be applied to understand Bangladeshi young behavioral behavioural intention to use mobile entertainment services. However, perceived fun was not supported for Bangladesh, possibly in developing countries. Our result indicates that whenever customers make decision to use mobile ringtone, music and gaming application, they will think whether these are worth to use or not.

5.4 (3rd Theme): Factors towards Intention to Use Mobile Entertainment Services among Young Users in Japan and Bangladesh: Comparative Cross-country and Cross-temporal Studies

5.4.1 Measurement Scales

In order to assess the reliability and validity of the constructs, several measures were computed. The composite reliability (CR), average variance extracted (AVE) and the squared inter-correlations (SIC) are reported for Japan 2009, Bangladesh 2014 and Japan 2014 in table 23, 24 and 25. The coefficients for each factor are shown in table 23, 24 and 25. Since all values exceeded 0.7, it was concluded that the items of these constructs had

common parts. The threshold for CR is 0.70 or higher (Bagozzi and Yi, 2011). All AVE values were above 0.5 indicating convergent validity. For discriminant validity, the AVE of each construct should exceed the SIC of the construct with other constructs. As shown in the table 22, 23 and 24, this holds true for all constructs.

Table 22. CR, AVE, and SIC for Each Construct for Japan 2009

Constructs	CR	AVE	Constructs				
			1	2	3	4	5
			AVE and SIC				
ATT	0.893	0.807	0.807				
BI	0.883	0.716	0.220	0.716			
PBC	0.844	0.652	0.374	0.165	0.652		
PV	0.862	0.757	0.258	0.226	0.216	0.757	
SN	0.902	0.754	0.534	0.216	0.426	0.261	0.754

Note: The values of AVE are on the diagonal and those of SIC on the off-diagonal.

Table 23. CR, AVE, and SIC for Each Construct for Bangladesh 2014

Constructs	CR	AVE	Constructs				
			1	2	3	4	5
			AVE and SIC				
ATT	0.900	0.818	0.818				
BI	0.889	0.728	0.269	0.728			
PBC	0.865	0.681	0.406	0.102	0.681		
PV	0.862	0.757	0.287	0.232	0.209	0.757	
SN	0.892	0.733	0.528	0.211	0.635	0.215	0.733

Note: The values of AVE are on the diagonal and those of SIC on the off-diagonal.

Table 24. CR, AVE, and SIC for Each Construct for Japan 2014

Constructs	CR	AVE	Constructs				
			1	2	3	4	5
			AVE and SIC				
ATT	0.920	0.852	0.852				
BI	0.778	0.554	0.180	0.554			
PBC	0.838	0.639	0.556	0.269	0.639		
PV	0.882	0.790	0.297	0.045	0.134	0.790	
SN	0.854	0.663	0.563	0.112	0.516	0.262	0.663

Note: The values of AVE are on the diagonal and those of SIC on the off-diagonal.

5.4.2 Analytical Method

The research models were analyzed for Bangladesh 2014, Japan 2009 and Japan 2014 via structural equation modeling (SEM) by using the statistical software AMOS version 22.0. The SEM is a statistical approach to understand social and natural phenomena by identifying a causal relationship between the observed variables and the latent variables that cannot be observed directly. A useful and powerful aspect of SEM is the test of hypotheses across samples (Bagozzi and Yi, 2011). In order to compare Japan 2009 and Bangladesh 2014 data, multi-group analyses were conducted on the models to determine whether there are statistically significant differences between the parameter estimates for Japan and Bangladesh. The research model for Japan 2014 data were analyzed individually.

Based on fit indices, the best was obtained. The classification of these model fit indices as roughly two types, absolute fit indices and comparative fit indices summarized by Hooper et al. (2008). The absolute fit indices include goodness-of-fit (GFI), adjusted goodness-of-fit (AGFI) and root mean square error of approximation (RMSEA). The comparative fit indices include Akaike Information Criterion (AIC), Browne-Cudeck Criterion (BCC), Normed Fit Index (NFI) and Tucker-Lewis Index (TLI). Threshold guidelines exist for these indices. The overall fit indices of the revised models were examined.

5.4.3 Results

5.4.3.1 Japan 2009 and Bangladesh 2014

We have conducted Three TAM-TPB models in order to establish the best-fit index. The three TAM-TPB models are as follows: The research model in Figure 6 was Model 1. Model 2 and 3 were created by using a step-by-step approach. Model 2 was created by deleting the non-significant path from subjective norm to behavioral intention in Model 1. Model 3

was created by deleting the non-significant path from Perceived behavioural control to behavioral intention in Model 2. Table 25 shows the fit measures for the three models for Bangladesh 2014 and Japan 2009 data. All fit indices are in the acceptable range for model 3. These results indicate that Model 3 has the smallest AIC value (183.8) and has the information criterion with the most significant estimated coefficients. Therefore, it was selected as the best model. The values for GFI (0.963) and AGFI (0.931) exceeded 0.9 and are thus in the acceptable range. The RMSEA is 0.031, which is less than 0.05 and thus considered to be a good fit (Tsang et al. 2004). Table 7 shows that the goodness of fit of generated or re-specified models are better compared to the hypothesized model. Table 26 shows the combined multi-group used in Model 3. In summary, generated values for model 3 are superior to those for the other models.

The final model for Japan is shown in Figure 13 and for Bangladesh in Figure 14. The coefficients of the measurement variables that explain the latent variables are all significant at the 5% level. Therefore, the measurement variables generally appear to explain the latent variables well. Table 27 shows the standardized estimates for Japan 2009 and Bangladesh 2014. All of the constructs for both countries are statistically significant at the 10% level or less. These results show that the models for the two countries fit well and that they were structurally similar. Hypotheses H12-H16 in model 3 was supported for Japan 2009 and Bangladesh 2014 in our analysis. Therefore, the supported hypotheses are: H12: Mobile users' attitude towards mobile entertainment services has a direct positive impact on their behavioural intention mobile entertainment Japan 2009 and Bangladesh 2014 and the hypothesis is accepted for Japan 2009 and Bangladesh 2014.

H13: Mobile users' perceived behavior control towards mobile entertainment services high positive impact on their attitude to use mobile entertainment services for Japan 2009 and Bangladesh 2014 and the hypotheses are accepted.

H14: Mobile users' perceived behavioral control towards mobile entertainment services has a direct positive impact on their perceived value to use mobile entertainment services for Japan 2009 and Bangladesh 2014 and the hypotheses are accepted.

H15: Mobile users' perceived value towards mobile entertainment services has positive impact on their attitude toward intention to use mobile entertainment services for Japan 2009 and Bangladesh 2014 and the hypotheses are accepted.

H16: Mobile users' perceived value towards mobile entertainment services has positive impact on their behavioural intention to use mobile entertainment services for Japan 2009 and Bangladesh 2014 and the hypothesis is accepted.

Table 25. Values of Model Selection Criteria on Each Model for Japan 2009 and Bangladesh 2014 (N=214)

Multi-group analysis	GFI	AGFI	RMSEA	CFI	AIC	BCC
Model 1 (hypothesized model)	0.889	0.825	0.79	0.851	559.6	568.9
Model 2 (excluded SN->BI)	0.963	0.930	0.031	0.981	186.2	191.8
Model 3 (excluded PBC->BI)	0.963	0.931	0.031	0.982	183.8	189.2

Table 26. Comparison of Model Fitting on Model 3 between Japan 2009 and Bangladesh 2014

	GFI	Sample size	AGFI	RMSEA	CFI	AIC	BCC	TLI
Japan 2009	0.961	214	0.928	0.048	0.978	94.4	97.1	0.966
Bangladesh 2014	0.964	214	0.935	0.038	0.985	89.4	92.1	0.978
Multi-group	0.963	214	0.931	0.031	0.982	183.8	189.2	0.972

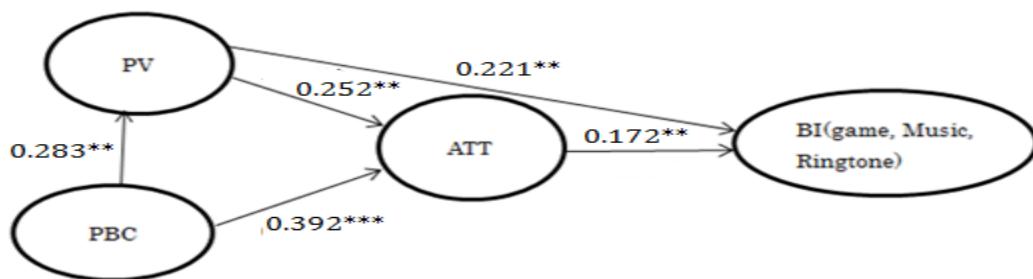
Table 27. Standardized Estimates of Model 3 for Japan 2009 and Bangladesh 2014

Hypotheses	Paths	Japan 2009	Bangladesh 2014	z- value
H12	Attitude → Behavioral intention	0.172**	0.230**	-0.322
H13	Perceived behavioral control → Attitude	0.392***	0.439***	-1.100
H14	Perceived behavioral control → Perceived value	0.283**	0.279**	0.541
H15	Perceived value → Attitude	0.252**	0.265**	0.150
H16	Perceived value → Behavioral intention	0.221**	0.220**	0.316

Note: ***p <0.001; **p <0.05; *p <0.1

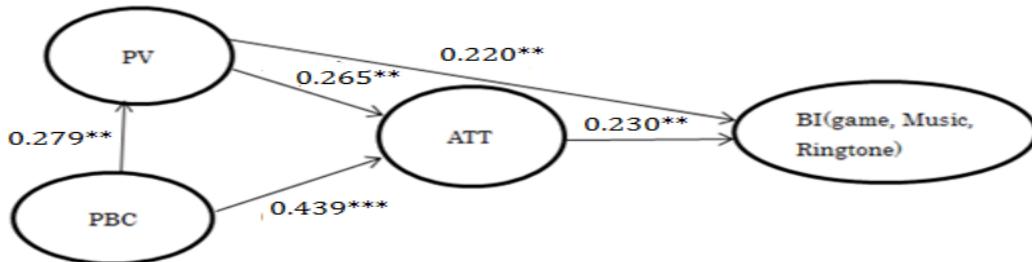
We also observed slightly different levels of standardized estimates for the path from Perceived behavioural control to attitude and attitude to behavioral intention between two countries. The standardized values of the estimates for the path from Perceived behavioural control to attitude in the Bangladesh data (0.439) were larger than those for the Japan (0.392). Similarly, for the path from attitude to behavioral intention, the estimated value for Bangladesh (0.230) was larger than that for Japan (0.172). These results indicate that the strength of users' perceptions on the primary constructs to behavioral intention could be generally similar among countries and cultures. In order to

confirm the differences between the estimated values, we conducted Z-tests on the level differences between the estimates for Japan 2009 and the Bangladesh 2014. The Z value shows no statistically significant differences exist in the estimated values. The basic causal structure of TAM-TPB research model could be equivalent across these countries after adjusting of time differences.



Note: ***p <0.001; **p <0.05; *p <0.1.

Figure 13. Path Analysis of Model 3 for Japan 2009 at significance level



Note: ***p <0.001; **p <0.05; *p <0.1.

Figure 14. Path Analysis of Model 3 for Bangladesh 2014 at significance level

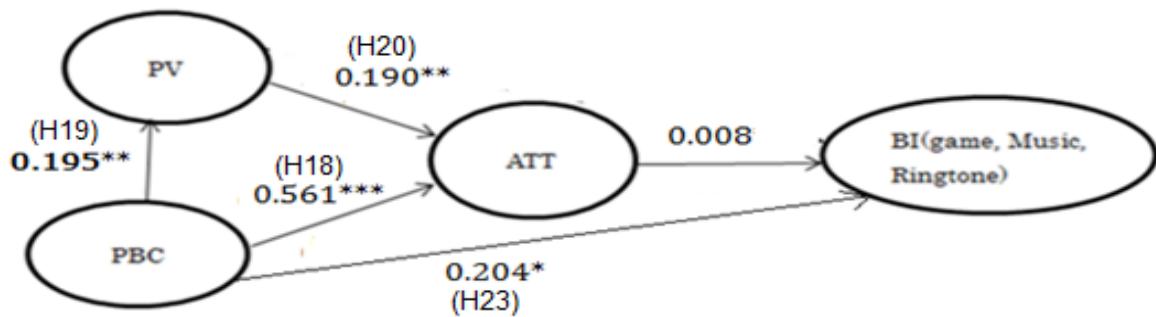
5.4.3.2 Japan 2014

The three TAM-TPB models for Japan 2014 data have observed. The research model in Figure 1 was Model 1. Model 2 was created by deleting the non-significant path from subjective norm to behavioral intention in Model 1. Model 3 was created by deleting the

non-significant path from perceived value to behavioral intention in Model 2. Table 28 shows the fit measures for the three models for Japan 2014 data. All fit indices are in the acceptable range for model 3. These results indicate that Model 3 has the smallest AIC value (82). The values for GFI (0.955) and AGFI (0.916) exceeded 0.9 and are thus in the acceptable range. The RMSEA is 0.048, which is less than 0.05 and thus considered to be a good fit (Tsang et al. 2004). The final selected model 3 with the standardized estimates for Japan 2014 is shown in Figure 15. All of the constructs are statistically significant at the 10% level or less except the path from perceived value and attitude to behavioral intention. But perceived behavioral control becomes significant positive relation with behavioural intention for Japan in 2014. This makes it convenient for Japanese customers in 2014 to use mobile entertainment services, giving perceived behavioral control a significant effect on behavioural intention. Hypotheses H18-H20 in model 3 was supported for Japan 2009 and Japan 2014 data and hypothesis H23 in model 3 was supported only for Japan 2014. These results of Japan 2009 and Japan 2014 seem that the relationship of the perceptions of value, control belief and attitude to behavioral intention could vary in the same country (Japan) at different times.

Table 28. Values of Model Selection Criteria on Each Model for Japan 2014

	GFI	AGFI	RMSEA	CFI	AIC	BCC	TLI
Model 1 (hypothesized model)	0.899	0.842	0.097	0.874	218	224	0.830
Model 2 (excluded SN->BI)	0.955	0.916	0.049	0.977	93	96	0.965
Model 3 (excluded PV->BI)	0.955	0.916	0.048	0.977	82	95	0.966



Note: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.1$.

Figure 15. Path Analysis of Model 3 for Japan 2014 at significance level

Therefore, the supported hypotheses are:

H18: Mobile users' perceived behavior control towards mobile entertainment services high positive impact on their attitude to use mobile entertainment services for Japan 2009 and Japan 2014 and the hypotheses are accepted.

H19: Mobile users' perceived behavioral control towards mobile entertainment services has a direct positive impact on their perceived value to use mobile entertainment services for Japan 2009 and Japan 2014 and the hypotheses are accepted.

H20: Mobile users' perceived value towards mobile entertainment services has positive impact on their attitude toward intention to use mobile entertainment services for Japan 2009 and Japan 2014 and the hypotheses are accepted.

H23: Mobile users' perceived behavioral control towards mobile entertainment services has positive impact on their behavioural intention to use mobile entertainment services only for Japan 2014 and the hypothesis is accepted for Japan 2014.

5.4.4 Findings

This study represents an attempt to find out the factors that influence the intention to use of mobile entertainment services among Japan 2009, Bangladesh 2014 and Japan 2014. This study makes an important contribution to the user behavior literature, because it is one of the first attempts to explain mobile entertainment service adoption by both a cross-country and cross-temporary context.

The findings of our study fully corroborate the previous studies of Constantiou et al (2009) concerning Denmark and UK, Kim et al (2009) for Korea and Kondo and Ishida (2014) concerning USA and Japan customers. At introduction stage of smartphone and 3G services (2009), this global adoption patterns for mobile entertainment services seemed accepted by other technologically developed places like Japan USA, Korea, Denmark, UK and etc. So, the globalization has forged a common user profile in the mobile entertainment service marketplace on the basis of market growth. In this study, we noted that having resources and skill to use smart mobile devices and mobile data services could affect the intention to use mobile entertainment services. At the early moments of adoption of smartphones and 3G services in Japan 2009 and Bangladesh 2014, we found factors' concerning perceived value was an effective factor on intention to use. Whereas at the later moment of adoption of smartphones and 3G/4G services in Japan 2014, we found factors' concerning perceived behavioral control is an effective factor on intention to use.

5.5 (4th Theme): The Contribution of Mobile Information Services to Fulfill User's Needs by Improving their Quality of Life in Japan

5.5.1 Analytical Method

The validity and reliability of the measures were tested using Partial Least Squares (PLS), a method well suited to handle both formative indicators (for Individual Contribution) and reflective indicators (for Overall Contribution) (Chin, 1998). The research models were analyzed for Japan 2013 via PLS by using the statistical software smart- PLS version 2.0 M3. PLS also has been used to construct a theory of mobile data service contribution to QoL by Choi et al. (2007a) concerning Japanese and Korean mobile users.

5.5.2 Validity and Reliability of the Measures

There are two types of measurement scale in structural equation modeling, i.e., formative or reflective. In the research by Choi et al. (2007a), both reflective and formative measurements were present in the same model. PLS is appropriate for handling both formative indicators and reflective indicators (Chin, 1998).

Because the criteria for assessing reflective and formative constructs are different, we assess the two types of constructs separately. In PLS, loadings represent the influence of individual scale items on reflective constructs (Bollen and Lennox, 1991). For reflective measurement scale, their indicator reliability, internal consistency reliability, or discriminant validity should be fully examined (Hair et al. 2013). Therefore, In order to assess the reliability and validity of the reflective constructs, we checked the factor loadings as confirmatory factor analysis, composite reliability (CR), Cronbach α coefficient and average variance extracted (AVE) for Overall Contribution in table 29. The results

indicate that all the measuring items secure convergent validity at the indicator level and construct level and the internal consistency.

Table 29. Reliability and validity of overall contribution for Japan 2013

Reflective Indicator	Items	CR ≥ 0.70	AVE ≥ 0.50	Cronbach $\alpha \geq 0.70$	Loading ≥ 0.50	t-value at $p < 0.001$
Overall Contribution	OVR 1	0.93	0.78	0.90	0.91	90.18
	OVR 2				0.93	108.74
	OVR 3				0.93	108.73
	OVR 4				0.75	25.27

Regarding the formative construct, in PLS, weights represent the comparable influence on formative constructs (Bollen and Lennox, 1991). Thus, we examine the formative item's weights, multicollinearity and discriminant validity of the formative construct. In a formative measurement model, the problem of indicator collinearity may occur if the indicators are highly correlated to each other. We have generated VIF and Tolerance values for collinearity checking. The Collinearity statistics as shown in Table 30, indicating that collinearity is not severe (Hair et al. 2013). For confirmatory factor analysis in table 33, the measuring items for one formative construct have the same factor loadings. All the individual measuring items show a value 0.5 or above (Afthanorhan, 2013) at the significance level of 1% in our model. Thus, all the measuring items used in this study are valid to measure equivalent variables in an individual manner. We used the standard bootstrapping procedure of 5000 samples recommended by Hair et al. (2013) to test convergent validity. The weights and *t*-statistics of all formative indicators in table 31, found to bear significant relationships at 1% significance level within the corresponding

life domains. Moreover, the weights for each of the question items are positive, which indicates that measures of Individual Contribution also were found to have the appropriate level of convergent validity.

Table 30. Collinearity statistics of formative constructs for Japan 2013

Independent Variables	Collinearity Statistics		Independent Variables	Collinearity Statistics	
	VIF< 5	VIF< 5		VIF< 5	VIF< 5
Community Life	1.810	1.810	Home-healthcare Life	2.083	2.083
User Life	2.228	2.228	Informational Life	2.757	2.757
Cultural Life	1.909	1.909	Leisure Life	2.597	2.597
Educational Life	2.207	2.207	Safety Life	2.467	2.467
Family Life	1.939	1.939	Self Life	1.864	1.864
Financial Life	1.832	1.832	Trustworthy Life	2.567	2.567
Friend Life	2.127	2.127	Work Life	2.196	2.196
Health Life	2.103	2.103			

We tested nomological validity of the model with and without our additional four life domains. We tested whether domain-specific contribution of mobile information services to QoL had a significant relationship with Overall Contribution of mobile information services to QoL. The coefficient of determination, R^2 was 0.58 for model 2, indicating acceptable fit in table 32. The fifteen individual life domains moderately explain 58% of the variance in overall contribution.

Table 31. Reliability and validity of individual contribution for Japan 2013

Formative Indicators	Items	CR ≥0.70	Weight	t-value	Factor Loadings≥ 0.50	t-value
Health Life	HEL 1	0.87	0.17	1.48	0.68	7.75
	HEL 2		0.64	5.14	0.94	23.09
	HEL 3		0.36	2.53	0.81	11.06
Home-healthcare Life	HML 1	0.92	0.04	0.23	0.63	5.91
	HML 2		0.98	9.57	0.99	79.28
Work Life	WOR 1	0.86	0.56	5.72	0.87	16.77
	WOR 2		0.12	1.47	0.67	11.2
	WOR 3		0.51	4.69	0.84	13.96
Safety Life	SAF 1	0.83	0.67	6.68	0.94	27.34
	SAF 2		0.26	2.61	0.79	13.3
	SAF 3		0.28	3.37	0.58	7.65
Financial Life	FIN 1	0.91	0.28	1.98	0.79	12.27
	FIN 2		0.19	1.18	0.8	11.17
	FIN 3		0.44	3.43	0.8	11.6
	FIN 4		0.34	2.18	0.82	12.92
User Life	CSR 1	0.87	0.14	1.23	0.72	8.76
	CSR 2		0.32	2.85	0.8	12.38
	CSR 3		0.63	5.37	0.94	26.15
	CSR 4		0.1	1.08	0.56	6.97
Family Life	FAM 1	0.87	0.34	3.06	0.74	10.63
	FAM 2		0.31	2.41	0.81	13.12
	FAM 3		0.46	3.64	0.82	14.61
	FAM 4		0.15	0.97	0.76	10.44
Cultural Life	CUL 1	0.92	0.49	3.79	0.83	14.33
	CUL 2		0.35	2.58	0.87	20.02
	CUL 3		0.06	0.55	0.9	23.88
	CUL 4		0.08	0.47	0.75	13.78
	CUL 5		0.19	1.9	0.73	12.56
Friend Life	FRI 1	0.9	0.19	1.7	0.76	12.93
	FRI 2		0.69	6.05	0.97	42.36
	FRI 3		0.24	2.12	0.79	12.6
Community Life	COML 1	0.94	0.57	4.04	0.95	29.68
	COML 2		0.5	3.53	0.93	24.54
Self Life	SEL 1	0.84	0.95	16.25	0.99	66.48
	SEL 2		0.12	1.02	0.48	4.19
Informational Life	IL 1	0.86	0.52	5.28	0.87	19.41
	IL 2		0.57	5.49	0.59	9.23
	IL 3		0.06	0.78	0.9	21.41
Trustworthy Life	TWL 1	0.86	0.81	8.75	0.98	45.16
	TWL 2		0.08	0.88	0.72	9.16
	TWL 3		0.23	1.91	0.61	7.95
Educational Life	EL 1	0.89	0.5	5.85	0.89	23.54
	EL 2		0.38	3.62	0.85	21.2
	EL 3		0.29	2.56	0.8	13.65
Leisure Life	LSRL 1	0.91	0.39	3.7	0.86	18.93
	LSRL 2		0.45	4.57	0.87	22.26
	LSRL 3		0.31	3.17	0.88	26.83

Meanwhile, predictive relevance is another aspect that can be explored for the inner model. The obtained Stone-Geisser's (Q^2) value (i.e., cross-validated redundancy measures) for overall contribution was 0.42 for model 2 in table 34, which indicates large predictive relevance. Regarding the overall quality of the PLS structural model, we computed the value of the Goodness of Fit (GoF) (Tenenhaus et al. 2005), which is shown in table 34. The GoF, Q^2 and R^2 values for model 2 are larger than those for model 1, resulting in our proposed model comparatively a better model. So, our newly added four life domains in model 2 are useful to forecast overall life and Overall Contribution and Individual Contribution were found to have appropriate levels of reliability and validity for Japan.

Table 32. Model selection criteria for each model for Japan 2013

Model Selection Criteria	R^2 of endogenous construct	Q^2	GoF
Model 1 from Choi et al. (2007a) (figure 9)	0.54	0.40	0.65
Model 2 with our additional four life domains (figure 11)	0.58	0.42	0.67

5.5.3 Results

According to the theoretical model in Fig. 11, the Individual Contribution of mobile information services will influence the Overall Contribution of mobile information services. In other words, if people feel that mobile information services improve their QoL in individual domains, they will also believe that mobile information services improve their overall QoL. However, we do not know which of the fifteen life domains are more closely related to the overall QoL. In order to explore these issues, we conducted a PLS analysis using the Bootstrap method of 5000 samples that is recommended by Hair et al. (2013) and estimated the path coefficients between Individual Contribution and Overall Contribution in Table 33.

The results from Japan indicate that contributions to six individual life domains had significant impacts on the overall contribution of mobile information services. In other words, if mobile information services can contribute to the QoL in the six life domains, it will have a high possibility of improving the overall QoL of young Japanese respondents. Contribution to the Informational life has the highest influence on the Overall Contribution with $\beta = 0.19$, $t = 2.97$, $p < 0.001$, followed by culture life ($\beta = 0.149$, $t = 4.273$, $p < 0.001$), friend life ($\beta = 0.17$, $t = 2.70$, $p < 0.001$), leisure life ($\beta = 0.15$, $t = 2.84$, $p < 0.001$), educational life ($\beta = 0.11$, $t = 2.34$, $p < 0.05$) and work life ($\beta = 0.10$, $t = 2.02$, $p < 0.05$). As the t-statistics, all these path coefficients are significant at the level of 5% or less.

5.5.4 Findings

This study has two layers (Bottom layer: Individual Contribution; top layer: Overall Contribution) to measure the contribution of mobile information services to users' QoL. Results from the two consecutive studies clearly indicate that two variables are valid and reliable in the bottom-up spillover theory. As users perceived a stronger contribution of mobile information services in specific life domains, they perceived a stronger contribution of mobile information services to their overall QoL. The Individual Contribution in the cultural, leisure, informational, friend, educational and work domain had the greatest impact on the Overall Contribution among Japanese young users.

Table 33. Comparative analysis between Japan 2013 and Japan-Korea from Choi et al. (2007a) in terms of path coefficients

Hypotheses	Japan 2013	t-value	Japan (Choi et al. 2007a)	t-value	Korea (Choi et al. 2007a)	t-value
Cultural Life --> Overall Life	0.18	4.08***	0.12	3.85***	0.02	0.27
Leisure Life--> Overall Life	0.15	2.84***	0.11	3.39***	0.06	1.63
Community Life --> Overall life	0.08	1.78	0.08	2.13	0.15	4.27***
User Life --> Overall Life	0.07	1.32	0.09	2.05	0.05	1.52
Family Life --> Overall Life	-0.08	1.66	0.02	0.94	0.14	3.20***
Health Life --> Overall Life	0.10	1.68	-0.00	0.31	0.00	0.03
Safety Life --> Overall Life	-0.01	0.22	0.02	0.55	0.02	0.67
Self Life --> Overall Life	-0.08	1.65	0.37	10.84***	0.33	9.34***
Financial Life --> Overall Life	0.00	0.09	0.23	6.34***	0.14	3.87***
Friend Life --> Overall Life	0.17	2.70***	0.03	0.78	0.06	1.57
Work Life --> Overall Life	0.10	2.02**	-0.06	2.52***	0.04	1.21
Home-healthcare Life --> Overall Life	0.09	1.64	N/A	N/A	N/A	N/A
Educational Life --> Overall Life	0.11	2.34**	N/A	N/A	N/A	N/A
Informational Life --> Overall Life	0.19	2.97***	N/A	N/A	N/A	N/A
Trustworthy Life --> Overall Life	-0.02	0.45	N/A	N/A	N/A	N/A
R ² value		0.58		0.63		0.51

Note: *** $p < 0.001$; ** $p < 0.05$

Our demographic values for Japan have some differences from Choi et al. (2007a) concerning Korea and Japan. They had 89% Korean respondents of age group below 30 years. On the other hand, they had 17% Japanese respondents' age of below 30 years. We have 97% Japanese respondents who are below 30 years old. The age of our sample has similarities with their sample for Korea but different from their Japan sample. In their study, 55-56% respondents were male for Korea and Japan. However, 72% of respondents in our study are male, so that our sample is skewed in gender. Demographic information about the effective participants is presented in Table 34. They conducted a large-scale

online survey in 2005-2006 before the introduction of 3G services with diverse mobile user groups who had different technological, educational and economic profiles. On the other hand, our online survey was conducted in 2013 among students in a university when 3G/4G mobile services have adopted much and who have almost the same technological, educational and economic profiles. The difference of gender, age, time, and user group may affect our results compare to them.

Table 34. The comparison of sample differences with Choi et al. (2007a) for Japan 2013

Category	Values	Japan 2013	In %	Korea (Choi et al. 2007a)	In %	Japan (Choi et al. 2007a)	In %
Gender	Male	137	72%	507	56%	569	55%
	Female	52	28%	397	44%	469	45%
Age	19 years old or younger	32	17%	177	20%	5	1%
	20-29 years old	151	80%	616	69%	174	16%
	30-39 years old	6	3%	96	11%	462	45%
	40 years old or older	N/A	N/A	18	2%	397	38%

Note: The age expression in Choi et al. (2007a) has corrected as follows:
From "Under 19 years" to "19 years old or younger" and from "Over 40 years" to "40 years old or older".

Cultural and leisure life domains are significant as these in Choi et al. (2007a) for Japan. Contribution of mobile information services to QoL in the Informational life domain has the significant positive impact on overall contribution of mobile information services. According to the proposed theory by Wilson (2006), information seeking behavior is triggered from physiological, socio-psychological, and cognitive needs as perceived by the information user. Wilson (2006) especially stressed the importance of studying the users'

information needs and that such needs are embedded in the user life world, the user him/herself, his/her role (e.g. job tasks, care needs) and the environment. Contribution of mobile information services to QoL in the educational domain has significant effect on overall Contribution of mobile information services to QoL for Japan. But Choi et al. (2007b) did not get significant effect between the contribution of mobile data services to educational life and the contribution to overall for Korean young users. They showed the reasons were poor usability of mobile devices inhibits active participation, and their limited bandwidth precludes effective use of multimedia broadcasting on online education. Contribution of mobile information services to QoL in the friend life has significant positive impact on overall contribution of mobile information services. Relationship with friends should be considered in any measure of QoL (Rahman et al. 2005). Contribution of mobile information services to QoL in work life has significant positive impact on overall contribution of mobile information services in our result. Rahman et al. (2005) identified the work life domains of depending on what were considered to be the major element of well-being.

This study operationalized fifteen life domains with our newly added four life domains to measure the contribution of mobile information services to QoL across Japanese young students. We successfully applied bottom-up spillover theory for the use of mobile information services by Japanese young users and found the importance of information and educational life domains out of our proposed four life domains. By using a model to measure the contributions of mobile information services to QoL with the original and our additional life domains, the research of Choi et al. (2007a) and this research gave stable results after considering time difference. Out of these considered life domains of the QoL,

we showed that the perceived contribution of each use experience for the following six life domains were found to be the key domains for Japanese young mobile information services users: informational life, cultural life, friend life, leisure life, educational life and work life.

5.5 Summary

The core objective of this chapter was to confirm the measurement and structural properties of the research models by ensuring adequate reliability and validity. The study also aimed to assess the relationships among the constructs in the models and to test hypotheses. Furthermore, the study aimed to examine the need structure of mobile information services, behavioural intention to use mobile entertainment services, the similarities and differences in usage of mobile information service and the contribution of mobile information services to QoL. To serve all these objectives, the study successfully applied factor analysis, PLS path modeling and component-based SEM, to estimate the parameters of the research model. The findings of the study supported some hypotheses. An in-depth discussion of these results and their implications, recommendations, weakness, future studies and overall conclusion are presented in the next chapter (Chapter six: Discussion, Implication and Conclusions).

Chapter Six

Discussion, Implication and Conclusion

6.1 Overview

This chapter aims to discuss empirical findings of the previous chapters in terms of theoretical significance, methodological rigor and practical contribution. The chapter briefly presents the entire findings addressing the four research objectives of the study proposed in Chapter 1. The chapter also discusses how the results fill the existing knowledge gaps and make significant contributions in the context of user usage behavior in mobile information service research. Overall, the objective of this chapter is to elucidate contributions of the study in terms of the adaptive behavior of mobile information service users and the contribution of these services in their QoL.

6.2 Reviews of the Research Objectives and Discussion on Them

The key objectives of the study were to explore the acceptance of mobile information services and to measure the contribution of mobile information services to improve the quality of life in order to fill the knowledge gaps in service systems research. To pursue these objectives, this study utilized concepts from mobile information service acceptance and QoL research theories in order to test the hypothetical relationships among constructs. This is a pioneering study in mobile information service research exploring the dimensions of usage intention and modeling the impact of overall quality on outcome constructs. The following section discusses the empirical findings that support the theoretical relationships, nature of the conceptual model and relevant hypotheses. The entire discussion addresses the four research objectives proposed in Chapter 1.

6.2.1 (Research Objective 1): Classify the Need structure of Mobile Information Services in Japan and USA

This first study constructs a method for comparing user needs for mobile information services in different countries. We attempted to gain an understanding of the cross-national needs structure through a comparison of use intentions between the United States and Japan. Toward this end, we extracted use intention factors from both the locations. Mobile information services could be categorized into four types for Japan: information, entertainment, low penetration and communication and three types for USA: information, entertainment and communication. This study also found that the two countries have different needs characteristics for a certain mobile communication service and roughly the same needs characteristics for mobile entertainment services and for mobile information services. The first study confirmed that differences in service needs between Japan and the United States were found in this research.

In the need analysis of the mobile services in Japan and the United States, communication i.e., mobile e-mail, displayed the largest difference. This finding can conclude that the behavioural intention for mobile services chat and mobile e-mail access was considerably higher in Japan than in the United States. The study findings can be confirmed by the report of comScore MobiLens (2011) that the use of mobile e-mail was 50% in Japan 2010 compare to 30% in USA 2010 and the use of SMS was 41% in Japan 2010 and 68% in USA 2010. The reasons may be summarized as follows: In the United States, a mobile phone is often viewed as a necessary tool rather than a luxury. People in the United States are just as enthusiastic about mobilizing technology, but they often think in terms of shrinking and mobilizing the PC and the Internet, rather than expanding the

mobile phone. Young people in the United States are much more likely to use SMS than e-mail. On the other hand, the standard messaging technology is mobile email in Japan, not SMS and MMS (which play no role in Japan), each handset has a unique email address and the cost of emails is included in the user's data plan. Japanese mobile email is much richer than SMS or MMS – they can contain up to 10,000 characters, user can embed multiple links, emoticons (smiley faces etc) and graphics, and attach files (Infinita Japan, 2010). Mobile service sales in Japan have been user driven: people use their phones for e-mail, music downloads, games, and mobile-wallet services, in which financial transactions are carried out via the mobile phone (Digital media in Japan, 2011). Similarly, Japanese adults and teenagers rely on their mobile phones for communication and for the types of functions that a laptop or desktop computer would normally provide. With so many types of services and phones available, they may have one phone solely for the purpose of talking and another phone just for e-mail and accessing the Internet, or for other capabilities. The increase in texting via e-mail is the natural extension of the mobile phone culture and etiquette, which dictates the correct and appropriate usage of phones because Japanese people do not want to listen to other passengers chatting incessantly on their phones while they are riding a train home from work. More depth consideration is needed about this point because it remains totally only in the rage of guessing.

As technology grows and develops, the mobile phone appears to be at the forefront of both exponential growth and the evolution of culture. The USA market has traditionally favored smart devices, such as the BlackBerry, which target business users as a path for potential growth. Japan has developed a sophisticated mobile phone market earlier than the United States. Many Japanese people look to their mobile device as a central source of

information gathering. This leads to a Keitai (mobile phone) culture that is more obvious in Japan than in other countries, partially because of the Japanese people's affection for technology in general. The citizens of Japan are very technologically savvy, with considerable technological research, development, and manufacturing occurring in their country. In this sense, the Japanese mobile market is years ahead of the U.S. market and is leading the way with respect to the mobile phone culture.

This study also confirmed the primary factors affecting the mobile information service needs in Japan 2008, Japan 2009 and USA 2009. These factors: Information intensiveness (Factor 1), entertainment (Factor 2), low penetration service (Factor 3), and communication service (Factor 4). Factor 2 represents services with entertainment characteristics, such as game, music and ring tones. The finding of the first study shows that mobile users in Japan 2008, Japan 2009 and USA 2009 have the needs on mobile entertainment service category with second highest penetration rate after the needs of communication service category. Since, communication service category is the basic task-oriented services and there have many researches on communication task oriented services but there was a rare research on entertainment oriented service category especially for a developing country context (ex. Bangladesh). Also mobile entertainment service usages are expanding but limited in Bangladesh. Therefore, I thought it was good time to focus on Bangladesh mobile entertainment market for device and service development. In the next study, I focused on this 2nd factor: mobile entertainment services for Bangladesh. Specifically, the following entertainment services are examined: Games, music, and ring tone services.

6.2.2 (Research Objective 2): Behavioural Intention to Use Mobile Entertainment Services among Bangladeshi Student

The second study tries to understand how mobile usage in Bangladesh access mobile entertainment services among young users. I proposed a modified technology acceptance model (TAM) and the theory of planned behavior (TPB) model with some original and additional factors. The three factors of perceived behavior control, perceived value and attitude are important determinants for behavioural intention mobile entertainment services. My result is potentially helpful for mobile operators to adopt the mobile entertainment service market in Bangladesh.

6.2.2.1 Accepted Hypotheses

Our results for mobile service usage by young Bangladeshi adults via our proposed TAM-TPB model produced results similar to those of Nysveen et al. (2005) concerning Norwegian customers and Kondo and Ishida (2014) concerning US and Japanese customers. The results of the best TAM-TPB model confirmed a directly positive impact of perceived value on behavioural intention, a directly positive impact of perceived behavioural control to perceived value and an indirectly positive impact of perceived behavioural control on behavioural intention through attitude to mobile entertainment services. Thus, attitude is a very important predictor affecting behavioural intention. These findings are consistent with Kondo and Ishida (2014) for Japan and USA. The result shows that the Bangladeshi mobile users have intention to use mobile entertainment services and this will depend on their attitude about these entertainment services.

Perceived value was found to be a strong predictor of behavioural intention to use. If the young realized the value and benefits of using mobile entertainment services which may

persuade them to use them. Perceived value is crucial in marketing performance because organizations could foster consumer purchase intention via product value (Steenkamp & Geyskens, 2006; Zhuang et al, 2010). The subjects of this study, young users with good educations, have many sources of information from which to obtain service knowledge. To form a behavioural intention, a user must collect information and evaluate the services. Therefore, in developing a use intention, most customers will consider what value the company can offer in terms of higher performance, better quality, and reasonable price through the entertainment service. Thus, the probability that users will use these services will increase if companies can provide such value. The findings highlight the importance of price and quality value in consumer decision making regarding mobile entertainment services. Future research may build on the study to examine how the pricing and quality value structure of the mobile entertainment service portfolio can influence consumer usage patterns (i.e., the relative frequency of use of different mobile entertainment services).

Perceived behavioural control was found to be a strong direct influence on attitude and an indirect predictor of behavioural intention to use. The users who believe that they have the necessary means, resources, ability, or technical help to use mobile entertainment services are more likely to have positive attitude to using them. This indicates that the users who believe that they have the self-confidence, means, and resources to use mobile entertainment services are more likely to have a positive attitude to using mobile entertainment services. Unless they have necessary technical support from mobile service providers to make them easy to use, young users may not have a positive attitude to using mobile entertainment services.

6.2.2.2 Unaccepted Hypothesis of the Path from Perceived Fun to Attitude

The hypothesis that perceived fun has effect on behavioural intention to use mobile entertainment services is not supported for Bangladesh in present. Notably, contradicting the findings of previous entertainment-oriented researches {Okazaki et al. (2008) for USA, Spain and Czech Republic; Yang, (2013) for USA}, the analysis of this study indicates that perceived fun does not motivate users to use mobile entertainment services. However, this result is consistent with the studies of Wahab et al. (2011) on Jordan and Dai and Palvia (2009) on China. Young Bangladeshi users might not perceive the present form of mobile entertainment services as a good source of fun and pleasure. One of possible reasons may be that technological aspects such as high speed quality, network coverage, sufficient services, easy payment, reasonable charge rate, etc. need to be improved as the fundamental base of perceiving convenience and fun from the services. In Bangladesh, entertainment systems and mobile phone structures have not developed enough presently. Young Bangladeshis focus on service charge rate and service quality rather than on the hedonic characteristics of mobile entertainment services in their intention to use. Thus, perceived fun may not be supported for developing countries, but it is for developed ones. Therefore, providing high enjoyment levels at affordable prices in entertainment services should be considered in developing countries.

6.2.2.3 Unaccepted Hypothesis of the Path from Perceived Convenience to Attitude

The hypothesis that perceived convenience has effect on behavioural intention to use mobile entertainment services is not supported for Bangladesh at present. However, this finding is an agreement with recent study by Jiang et al. (2015) on mobile gaming adoption for China in terms of perceived usefulness that construct was replaced by perceived convenience in Okazaki et al. (2008) for USA, Spain and Czech Republic. I applied it for Bangladesh case to know whether this predictor is applicable for a developing country context or not. Perceived convenience may be not supported for developing countries right now, but it is for developed ones. So, mobile operators in Bangladesh may need to provide efficient ways to make mobile entertainment services use conveniently. It can be conducted by providing convenience to play high quality game anytime anywhere without having 3G or smartphone or reduction of the charge rate of internet or 3G connections, etc.

6.2.2.4 Unaccepted Hypotheses of the Paths from Perceived Ease of Use to Perceived Fun and Perceived Convenience

According to the analytical results, perceived fun and perceived convenience did not appear to drive user participation. Since, perceived ease of use has the direct path to perceived fun and perceived convenience, it has automatically removed after removing the non-significant constructs perceived convenience and perceived fun. If difficulties of use cannot be overcome, then the user may not perceive the convenience and enjoyment.

User usage behavioral intention may change dramatically for an emerging mobile market, so that further analysis on these predictors (perceived fun, perceived convenience and

perceived ease of use) needs to be addressed in conjunction with mobile entertainment market. Hence, the findings infer that another factors such as perceived value, perceived behavioural control and attitude those are related to the acceptance of mobile entertainment services should be considered for Bangladesh in a future research.

6.2.2.5 Unaccepted Hypothesis of the Path from Subjective Norm to Behavioural Intention

The hypothesis that subjective norm has effect on behavioural intention to use mobile entertainment services is not supported for Bangladesh at present. This follows what was found in Kondo and Ishida (2014) and Nysveen et al. (2005). Subjective norm found rarely significant for mobile entertainment services in past studies. I did not expect that it would be significant. This study applied subjective norm for Bangladesh to find out the diversity of subjective norm in a different developing country context. Since the participants in this study were young people with good educations and experience with technology, the effect of social influence may decline.

6.2.2.6 TAM-TPB framework

There are more similarities than differences among the youth's intention to use mobile entertainment services in the TAM-TPB framework. However, few empirical studies have been done on the factors connecting youth and the adoption of mobile entertainment technology. Therefore, this framework can be considered to be universal for mobile entertainment services use among youth. In the next two studies, I have tried to understand the similarities rather than differences among the youth's intention to use mobile entertainment services in the TAM-TPB framework. Those are by a cross-country context between Japan 2009 and Bangladesh 2014 and cross-temporal context between

Japan 2009 and Japan 2014. Kondo and Ishida (2014) applied the TAM-TPB model for cross-national analyses of the intention to use multiple mobile entertainment services for Japan 2009 and USA 2009. They utilized the model for mobile entertainment services in the USA and Japan based on a 2009 data set of young users. Mobile entertainment adoption was still in the early stage before the expansion of services begun with the introduction of the iPhone 4 in 2010. I consider that Bangladesh in 2014 is at the same introduction stage for the adoption of smartphones and 3G services for entertainment that Japan and the US were at in 2009. Therefore, I conducted the third study in the context of a developing country, Bangladesh, by using the TAM-TPB model of Kondo and Ishida (2014) as a basis to confirm their reasoning.

A static view of the influence of variables such as those in TAM-TPB on mobile entertainment usage has taken by Kondo and Ishida (2014); they have not considered how the influence of those factors may change as users experience with the technology changes over the course of a service system's lifecycle. The model of intention to use mobile entertainment service may vary across different life cycle stages (introduction and growth stages) of smartphone and 3G/4G services. Different variables within the model may have different influences on intention depending on experience of smartphone and 3G/4G service usages. Therefore, the third study conducts comparative studies on behavioural intention of mobile entertainment services to find out the differences in usage between two time periods Japan 2009 and Japan 2014.

6.2.3 (Research Objective 3): Factors towards Intention to Use Mobile Entertainment Services among Young Users in Japan and Bangladesh: Comparative Cross-country and Cross-temporal Studies

The third study empirically tested TAM-TPB model that explains users' intention to use mobile entertainment services in two distinct cultural contexts: Japan 2009 and Bangladesh 2014 and two different time contexts: Japan 2009 and Japan 2014. The results are discussed below.

6.2.3.1 Comparative Examination of Similarities between Japan 2009 and Bangladesh 2014

There are similarities in the path relationship of construct in Japan 2009 and Bangladesh 2014. We could not detect any statistically significant differences between Japanese and Bangladeshi users along the dimensions of perceived value, subjective norm, behavioral control, attitude and behavioral intention in the mobile entertainment service environment. In other words, I regard these characteristics of m-entertainment service at about equal level in Japan 2009 and Bangladesh 2014.

This analysis found strong impact of attitude to behavioral intention, perceived behavioral control to attitude, perceived behavioral control to perceived value, perceived value to attitude and perceived value to behavioral intention for mobile entertainment services in Japan 2009 and Bangladesh 2014. This follows the same result that was found in previous research of Kondo and Ishida (2014) for 2009 mobile entertainment service data of Japan and USA. They also similarly suggested that users' positive attitude is influenced

by the positive value perception and the perception of value is affected by the user's positive perception of their ability to using entertainment services.

The results showed that the path from perceived behavioral control to behavioural intention is not supportive both for Japan 2009 and Bangladesh 2014. This is an agreement with Kim et al. (2009) for Korea on mobile entertainment services. This indicates that levels of skillfulness in using mobile services are not related to behavioural intention mobile entertainment service when the both countries were at the innovation level of smartphone and 3G services.

Young user's intention to adopt mobile entertainment services at an earlier stage appears to be determined to a greater extent by perceived value that they are receiving. Constantiou et al. (2009) for Denmark and UK young adults and Wong and Hiew (2005) for Malaysia have also underlined the importance of perceived value to behavioural intention for mobile services. It means that potential new adopters of mobile entertainment services will only be attracted to mobile entertainment if there is a clear perceived benefit of the services from their perspective.

As technology grows and develops, the mobile phone appears to be at the forefront of both exponential growth and the evolution of culture. In this sense, the Japanese mobile market is years ahead of the Bangladesh market and is leading the way with respect to the mobile phone culture. In 2008-2009, the smart phone and 3G market in Japan was in introduction stage, so that only innovators would adopt. At the "innovator" phase, disposable income has been highly correlated with early-stage mobile phone adoption in developed and emerging markets. Marketing become generally more important in maturing mobile service market (Kalba 2008). To shine with the 3G growing world,

Bangladesh had started its journey of smartphones and 3G on 2012-2013. Our data deal with mobile entertainment service in Japan 2009 and Bangladesh 2014 in order to adjust adoption stage of smartphones and 3G. There were time difference but the results seem similar because Bangladesh in 2014 is at the same growth stage of provided 3G mobile services where Japan was in 2009.

On the other hand, after making a cross-country inference from the convergence of mobile entertainment service adoption, this study summarized that young user' basic perceptions on behavioral intention and attitude toward mobile entertainment services will be similar because of the presence of global youth culture. Constantiou et al. (2009) also did not get significant differences in the mobile services use (such as entertainment services) except banking services between Denmark and UK. May be at that time, developed countries was in same situation of providing 3G mobile services as now Bangladesh is in 2014.

6.2.3.2 Comparative examination of differences between Japan 2009 and Japan 2014

Our results confirmed the significant paths from perceived behavioral control to attitude, perceived behavioral control to perceived value, perceived value to attitude and perceived behavioral control to behavioral intention for mobile entertainment services for Japan 2014. The path from perceived value to behavioural intention and attitude to behavioral intention were supportive for Japan 2009, but not for Japan 2014.

6.2.3.2.1 Changes in Path Significance from Japan 2009 to Japan 2014

Since this study conducted a structural equation modeling that reveals a system, a path individually should not be compared. So, I considered the following two combinations of

direct and indirect paths to discuss. These changes in path significance are a new situation for a TAM-TPB model that has different structures between for Japan 2009 and Japan 2014.

Direct Effect from Perceived value and Attitude to Behavioural Intention in Japan 2009

Perceived value was a significant predictor for behavioural intention to mobile entertainment services in Japan 2009 and has an indirect effect to intention via attitude. This finding indicates that if the young user realized the value and benefits of using mobile entertainment services which may persuade them to use them and positive attitude to them. Perceived value is crucial in marketing performance because organizations could foster consumer purchase intention via product value (Steenkamp & Geyskens, 2006; Zhuang et al, 2010). Purchase intention indicates that consumers will follow their experience, preference, and external environment to collect information, evaluate alternatives, and then make a purchase decision (Zeithaml, 1988; Dodds et al., 1991; Schiffman & Kanuk, 2000; Yang, 2009). To form a behavioural intention, a user must collect information and evaluate the services. Therefore, in developing a use intention, most customers in Japan 2009 had consider what value the company could offer in terms of market attributes such as payment systems. For example, a charging platform called “i-mode” has created and collects a data transmission fee from all mobile information services. This makes it convenient for Japanese customers in 2009 to purchase mobile services, giving perceived value a significantly direct effect and indirect effect via attitude on intention to use. Thus, the probability that users will use these services will increase and users have positive attitude if companies can provide such value. Japanese mobile users in 2009 intend to use mobile entertainment services if they hold favorable attitudes toward them.

Indirect Effect from Perceived Behavioural Control to Behavioural Intention via Attitude but no Effect from Perceived Behavioural Control to Behavioural Intention in Japan 2009

Perceived behavioural control was not a significant predictor of behavioural intention to use mobile entertainment services in Japan 2009 but there was an indirect significant effect between perceived behavioural control and behavioural intention through attitude. In Japan 2009, when technology such as 3G or smartphone services just in introduction stage; resources, knowledge, and technical support as essential to acceptance of a mobile entertainment services was not much proliferated among users. So, they might feel that they had not enough control over behavior they need to exhibit towards intention to use mobile entertainment services in Japan 2009.

Not Effect from Perceived Value and Attitude to Behavioural Intention in Japan 2014

Perceived value and attitude was not a significant direct predictor for behavioural intention to mobile entertainment services in Japan 2014, but has an indirect effect to intention via attitude. One reason can be using mobile entertainment services via 3G/4G or smartphone (ex. smartphone browser game) is not a new idea for the participants in Japan 2014. Since using mobile entertainment services by using 3G/4G, smartphone, charging platform called “i-mode”, etc is a relatively common practice and its benefits and the efforts needed to perform this behaviour have been acknowledged widely, mobile users in Japan 2014 may have been relying on their existing knowledge, as opposed to whatever additional knowledge the mobile marketers.

Direct Effect from Perceived Behavioural Control to Behavioural Intention but no Effect from Atttitude to Behavioural Intention in Japan 2014

Perceived behavioural control is a significant predictor for behavioural intention to use mobile entertainment services in Japan 2014 and perceived behavioural control has no indirect effect to intention via attitude. Nasveen et al. (2005) defined mobile entertainment services such as game as an experiential mobile service. Skill and control which predicts perceived behavvioural control is involved with flow of experience on the web as a cognitive state during online navigation (Hoffman and Novak, 1996). Experience has been studied in the context of information technologies and has been recommended as useful in understanding consumer behavior (Hoffman and Novak, 1996; Novak et al. 2000). When in the flow state of experience to use mobile entertainment services in Japan 2014, people become absorbed in their activity: they lose self-consciousness, and they feel experienced, skilled, confident and in control of their using environment of mobile entertainment services. Users should achieve skill, self-confidence and control over using mobile entertainment services through experience. When a user becomes familiar with mobile entertainment services (smartphone browser game) in Japan 2014, the user is rarely attracted to new game because of his or her immersion in the first. Such immersion proves that perceived behaviour control directly affects user's behavioural intention. Such a concept has been extensively applied in studies of a broad range of contexts, such as sports, shopping, rock climbing, dancing, gaming and others entertainment related studies (Csikszentmihalyi and LeFevre, 1989).

This is also a supportive result by Yang (2013) which predicted young American users' attitude was not but their perceived behaviour control was supported for mobile apps intention in 2011. May be the path from attitude to behavioural intention is consistent for developed country with the current knowledge of mobile service using behavior. This can summarize from these studies that attitudes may not always predict behavioural intention, suggesting that cognitive (emotions/ feelings) and affective (belief/ knowledge) components of attitudes are not necessarily expressed in behavioural intention. The theory of planned behaviour (TPB) constructs varies as a function of whether the individual has performed the behavior infrequently or frequently (Terry and Hogg, 1996; Fekadu and Kraft, 2001). At low levels of past behavior, the TPB construct to emerge as a significant predictor of intention was attitude. Thus, when a behavior was not a regular part of a person's behavioral repertoire to use mobile entertainment services in Japan 2009, behavioral intentions appear to reflect the person's cognitions and evaluations of the behavior through the attitude. In contrast, at levels of past behavior increased in Japan 2014, intention might be predicted best by the person's perception of control over using mobile entertainment services. Thus, repeated engagement in a behavior may demonstrate to an individual that the behavior is under his or her control and can be performed easily and often. The reasons that may cause the changes in paths for Japan 2009 and Japan 2014 are provided below.

Changes in Japan 2009 and Japan 2014 in terms of Perceived Value, Attitude and Behavioural Intention

There are significant differences in users' perceptions of value and attitude to behavioral intention of mobile entertainment services (game, music and ringtone) between Japan

2009 and Japan 2014. Perceived value, in conjunction with attitude, may play an important role in initiating behavioural intention. However, once the benefits and the efforts needed to using mobile entertainment services have become more common practice in Japan 2014 compare to Japan 2009, perceived value may play a less critical role in determining behavioural intention. The missing link in this may be explained by the possibly due to the differences in sample characteristics such as age ratio; 46% of participants' age was between 18-20 years old for Japan 2014 data, whereas 17% of participants' age was between 18-20 years old for Japan 2009 data set.

Market Changes in Japan 2009 and Japan 2014 Related to Perceived Behavioural Control, Attitude and Behavioural Intention

There are significant differences in users' perceptions of behavioral control and attitude to behavioral intention of mobile entertainment services (game, music and ringtone) between Japan 2009 and Japan 2014. The market value of mobile entertainment service in Japan is increasing markedly and the number of users is growing rapidly in 2014 compare to 2009. For the first time since the launch of the iPhone back in 2007, Japan is the top grossing country for iPhone's most popular content: games. It has estimated that 160 billion apps will be downloaded in 2017, gaming being one of the fastest growing segment for Japan. The iPhone has expanded mainly from 2010 in Japan and after that Japanese entertainment market such as game market has shifted toward smartphone devices. According to a co-research by CyberZ and Seed Planning (2013), the smartphone game market scale in 2013 was 546.8 billion yen, rising 178% from 2012, reaching approximately half of the game market of Japan (figure 16). Due to the technology changes and time differences thus may addresses the changes of mobile users' control over using

mobile entertainment services in Japan 2014 than 2009. Perceived barriers might have been reduced with time while the perception about the ability to use mobile entertainment services was enhanced, thereby leading to improvement of perceived behavioural control in Japan 2014. The attitude towards mobile entertainment services may have changed for Japan 2014 compare to Japan 2009 due to the time difference. As the mobile market is an emerging market and the using behaviour of mobile services change dramatically, further analysis with large sample size need to investigate on this issue.

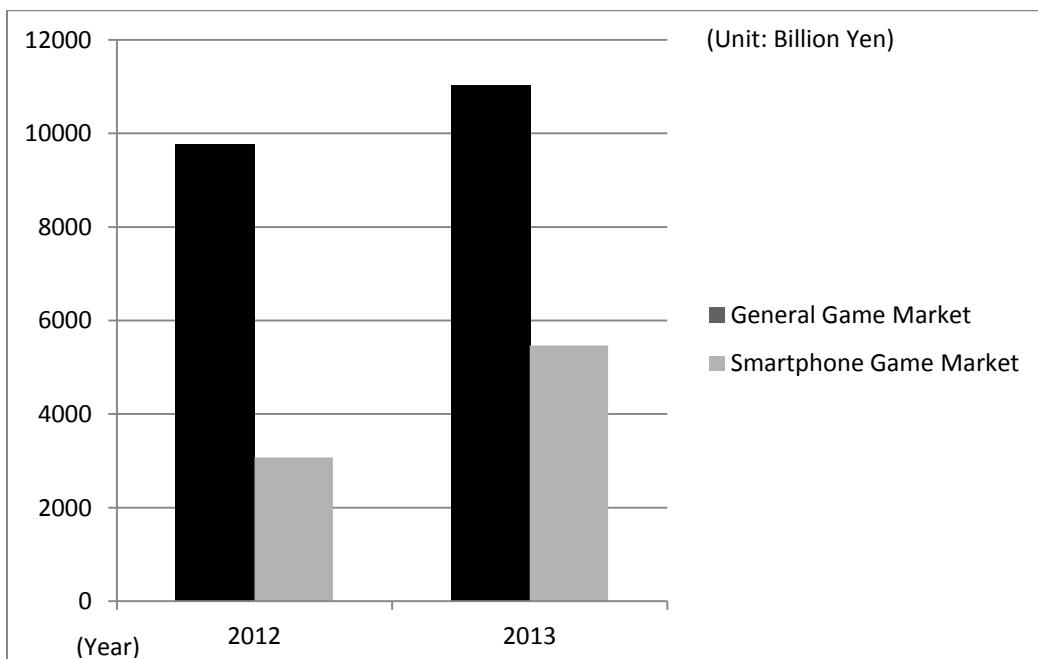


Figure 16. Market size of general game and smartphone game in Japan

We found differences between Japanese 2009 and Japanese 2014 and similarities between Japanese 2009 and Bangladeshi 2014 mobile entertainment service usage by young adults through TAM-TPB model. Thus, after having economic status of the two countries and time differences, these patterns can be considered as universalities or generalities of mobile service use beyond recognized cultural differences. Service providers in Bangladesh can revise their business models to reach out to mobile entertainment users

when they are in early stage of smartphones and 3G by following the introduction stage of Japan in 2009 which will provide an expectation of further expansion of its future market.

6.2.4 (Research Objective 4): The Contribution of Mobile Information Services to Fulfill User's Needs by Improving their Quality of Life in Japan

From the first study, the need structure of different mobile information services factors have identified for Japan. Fourth study has tried to understand how the needs of user's life are effectively achieving by using mobile information services. This study has two variables (Individual Contribution and Overall Contribution) to measure the contribution of mobile information services to users' quality of life. Results from the consecutive study clearly indicate that two variables are valid and reliable in the bottom-up spillover theory. As users perceived a stronger contribution of mobile information services in specific life domains, they perceived a stronger contribution of mobile information services to their overall quality of life. The Individual Contribution in the cultural, leisure, informational, friend, educational and work domain had the greatest impact on the Overall Contribution among Japanese young users.

The findings for Japan have some similarities with those from Choi et al. (2007) for Korea and Japan. Choi et al. (2007) measured the contribution of a mobile data service technology to the quality of users' lives. From our Japan results, contribution to the cultural and leisure life has the influence on the Overall Contribution. These results are the same as those were significant in Choi et al. (2007) for Japan also. As the country is the same, Japan, we got similar result probably due to same cultural and economy. We also have some similarities in case of non-significant results. User life, health life and safety life were not the

determinant of overall contribution in Choi et al. (2007) for both Japan and Korea; we also found the same for Japan 2013.

The findings of our study for Japan 2013 have some differences compare to those from Choi et al. (2007a) for Korea and Japan. They obtained significant effect of financial life and self life to the overall contribution for Japan. However, we obtained insignificant result on those. This may be possibly due to the characteristics of sample such as gender ratio. Another difference is on Friend life, which is significant in our result, but insignificant for Japan as well as Korea in those of Choi et al. (2007a). All of the respondents are students, so that friend life can be a focusing domain for them. The contribution to work life in Choi et al. (2007a) for Japan was found to be negatively related to the Overall Contribution but in the result, it is opposite, positively related. Our most respondents in Japan were in their twenties, it is reasonable that work life as part-timers may be important for them.

The additional four life domains, informational and educational life domains become significant for Japan in our results. Since the respondents all are students, mobile information services have strong impact on their educational lives by searching dictionary, on-line translation, on-line education and etc. Mobile information services also have strong impact on their informational life by searching news, weather, maps, personal information and etc. Our data was from 2013 when 3G/4G services and smartphone has adopted, so that mobile device has become a key device for information gathering after the introduction of 3G/4G services. It helps user to get information via mobile anytime and anywhere.

Choi et al. (2007) study was on mobile services for Japan 2006 or before and this study was for Japan 2013. Based on my reasoning, there were lots of changes in Japan on mobile

technology between these two time periods. A technology difference such as the smartphone market in Japan has expanded since 2009-2010 after the study of Choi et al (2007) for Japan. According to Mobile Computing Promotion Consortium (MCPC) Smartphone Committee in Japan (2009), Smartphone market for fiscal 2009 was projected to grow by about 50% compare to 2008 (see figure 17). Whereas, the smartphone penetration rate was 82% and 3G/4G penetration rate was 85.3% in Japan, 2013. The continued growth of broadband communications and the expanded availability of applications and services in the open-source environment drive mobile information service usage difference between 2006 or before and 2013. A survey among the Internet users in Japan, 2013 by a Japanese advertising and PR firm Hakuhodo surveyed that 3 out of 4 internet users whose age between 15-19 years and 7 out of 10 internet users whose age between 20-29 years, are the owner of smartphone (see figure 18). These analysis supports that sample difference on gender, age, job status, timing difference, technology difference (3G/4G, smartphone, high speed quality, comfortable in using, etc.) may cause the differences in usage behavior of mobile information service users between Japan 2006 or before and Japan 2013.

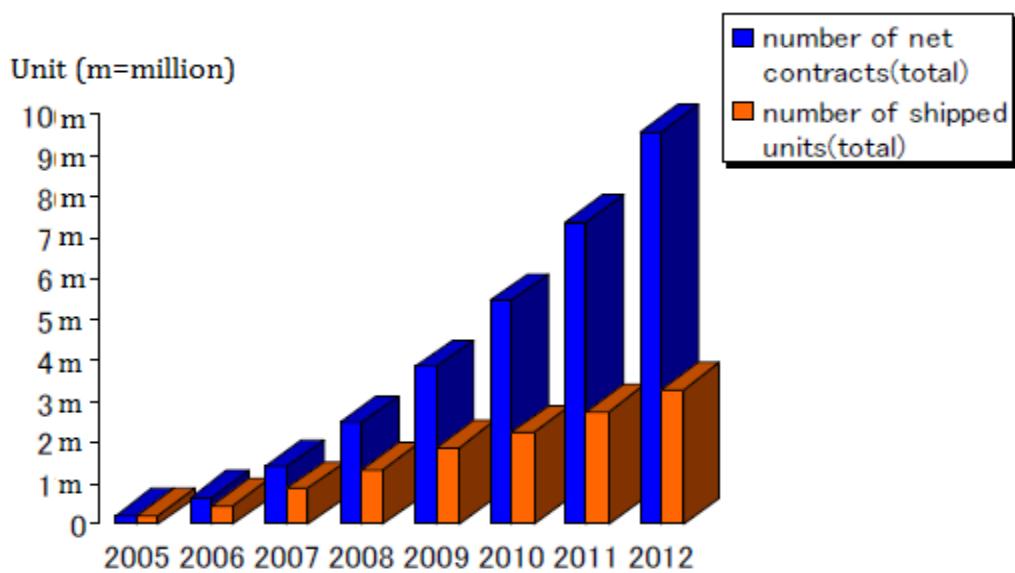


Figure 17. Estimation of the smartphone market by Mobile Computing Promotion Consortium (MCPC) Smartphone Committee in Japan, 2009.

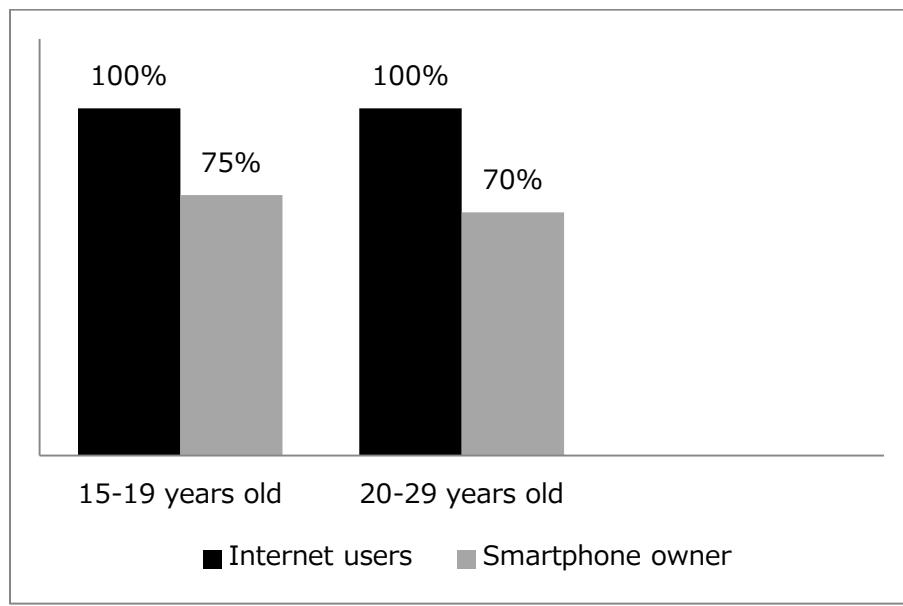


Figure 18. Smartphone Penetration rate among young internet users in Japan, 2013.

Cultural and Leisure Life

Cultural and leisure life domains are significant as these in Choi et al. (2007a) for Japan. They explained the strong effects of leisure and cultural life for the Japanese people by the higher national wealth (GNP and GDP) of Japan. People with greater monetary resources are more interested in their leisure and cultural life. Although our data set was for 2013 but we got similar result because of the stable economy of the same country, Japan.

Informational Life

Contribution of mobile information services to QoL in the Informational life-our newly added life domain; has the strongest impact on overall contribution of mobile information services. According to the proposed theory by Wilson (2006), information seeking behavior is triggered from physiological, socio-psychological, and cognitive needs as perceived by the information user. Wilson (2006) especially stressed the importance of studying the users' information needs and that such needs are embedded in the user life world, the user him/herself, his/her role (e.g. job tasks, care needs) and the environment. The information users in Japan may seek information from different sources. Mobile device is one of the greatest devices among choices to get information and Japanese young can improve their life by getting information anytime anywhere through mobile devices.

Friend Life

Contribution of mobile information services to QoL in the friend life has stronger impact on overall contribution of mobile information services. Relationship with friends should be considered in any measure of QOL (Rahman et al. 2005). Satisfaction with friend life is an important element of an individual's well-being in fact when they are young adults. It is quite reasonable that, in most cases, an individual young mobile user with strong friend

ties will be happier by sending photos, contracting with friends and congratulating friends on their birthday, etc.

Educational Life

Contribution of mobile information services to QoL in the educational domain has significant effect on overall Contribution of mobile information services to QoL for Japan. But Choi et al. (2007b) did not get significant effect between the contribution of mobile data services to educational life and the contribution to overall for Korean young users. They showed the reasons were poor usability of mobile devices inhibits active participation, and their limited bandwidth precludes effective use of multimedia broadcasting on online education. Our data set was for Japan 2013 when they are effective 3G/4G and iPhone users. So, mobile devices become effective media for online education of young students for the availability of advanced mobile technologies. Hence, our result for educational life domain may become significant.

Work Life

Contribution of mobile information services to QoL in work life has stronger impact on overall contribution of mobile information services in our result. Rahman et al. (2005) identified the work life domains of depending on what were considered to be the major element of well-being. Estimates of unemployment rate and combined first, university gross enrolment ratio are used to capture the extent of work and productive activity that exists in a country. Young citizens of Japan are productively engaged either in work employment, or engaged in the process of learning in university via their mobile phones.

First study found four mobile information service needs factors, among them entertainment is one. Next study used this mobile entertainment service factor and

identified some important antecedents those influence behavioural intention to use mobile entertainment services in Bangladesh by using TAM-TPB model. Another study finds the similarities and differences in usage intention of mobile entertainment services by comparative studies between Japan and Bangladesh by using same TAM-TPB model. By using bottom-up spillover hierarchy model, last study finds some important life dimensions in those mobile information services have contribution to fulfill the needs of user's life by improving their quality of life

6.3 Implication and Recommendation

6.3.1 Implication and Recommendation from Economical Outcome,

Acceptance of Mobile Information Services Studies

The first study confirmed that mobile information services needs could be categorized into three types: information, entertainment, and communication in Japan and the United States, communication displayed the largest difference. By focusing on communication factors, mobile international marketing managers should give extra care to those service areas and develop unique mobile strategy to each country. This study should help to understand which service factor is important in the needs of mobile service in both countries as information service factor has largest variability. The smart phone market in Japan expanded in 2010 with innovative and diverse formats. This data dealt with mobile information service needs in 2009 instead of the actual usage. At the rapid growth of smart phones in 2010, this analysis based on the 2009 needs data successfully predicted the potentiality of the mobile information service needs.

Since the first study identify the mobile entertainment services as a need factor among four mobile information services after the mobile communication services. Kondo and

Ishida (2014) applied a Tam-TPB model for mobile entertainment services for Japan 2009 and USA 2009. Since this study expecting that Bangladesh in 2014 is in the homogeneous adoption stage of mobile entertainment services where Japan and USA were in 2009. So, the next study tries to focus on the mobile entertainment service intent in Bangladesh 2014 by examining a modifying TAM-TPB model. This study contributes to the literature mobile entertainment services on adoption by identifying behavioural intention characteristics in Bangladesh. Identifying the user intentions to adopt in the Bangladeshi marketplace helps researchers localize mobile entertainment services strategy recommendations. Concerning the impacts of perceived value, perceived behavioural control and attitude on intention to use mobile entertainment services, the authors found results about Bangladesh similar to those found in research on Japan and the US. Therefore, this framework is useful for the Bangladeshi mobile entertainment market. This study found that attitude is the key variable of behavioural intention, so that mobile company should make an effort to elevate user's positive attitude towards mobile entertainment services. Mobile companies should also enhance the perceived value of their mobile entertainment services to make user's positive attitude and intention to use. The probability that they will use these entertainment services will be higher if mobile companies provide the value such as superior entertainment quality and reasonable prices. Another recommendation is that providers will have to improve their services, network coverage, charging rate, speed quality which will add value of these mobile entertainment services in Bangladesh. Therefore, mobile companies should dedicate the budgets, advanced technology, and resources needed to improve the quality of their mobile entertainment services. In their advertisements, they should emphasize the value that their mobile entertainment services

can provide to their users. This research model is useful for vendors of mobile services interested in designing and providing new services with good quality for mobile entertainment. Perceived behavioural control was found to cause a strong direct predictor of attitude and be an indirect predictor of behavioural intention to use mobile entertainment services. So, authors' recommendation is that mobile operators should need to strengthen their organizational and technical systems to help young users feel able to use mobile entertainment services.

The use of mobile entertainment services via smartphones and 3G connections is expanding. Bangladesh is a potential market for the mobile entertainment business. Service providers in Bangladesh may need to revise their business models to reach out to mobile entertainment users when in the early stage of smartphone and 3G use by following the introduction stage taken by Japan in 2009, providing the expectation of further market expansion. For example, the largest mobile operator in Bangladesh, Grameen Phone, provides game services at 40 BDT per download and songs at 40 BDT per album download through mobile Internet for an Internet charge of 350 BDT a month (1 BDT = 0.013 US dollars). Users need to pay individually for each service many times, and the payment process is not easy. Meanwhile, the main success factors for mobile services in Japan have been: targeting the right kind of customers, providing the right kind of content, making the services easily available and easy micro-payment-based charging (Kaasinen, 2005). In Japan, almost every mobile information service includes carrier charges, known as 'data transmission fees' (as opposed to 'application use fees'), which are paid to the service or application provider. This makes it convenient for Japanese customers to pay mobile services, giving perceived value a significant effect on intention to use. Another

intervention is NTT DoCoMo's i-mode, a 3G connected mobile Internet service popular in Japan. i-mode's strengths in Japan also lie in meeting customer needs in a simple and usable way, simplifying the mobile user experience and thereby providing a relative advantage. Users of i-mode have access to various services, such as mobile Web and games. Content is provided by specialized services, typically from the mobile carrier, which allows them tighter control over billing. This gives self-ability (i.e. the resources, means) to Japanese customers using mobile services, lending perceived behavioural control a significant effect on attitude and intention to use. Although 3G services in Bangladesh are not sufficient but growing. It is a good time for Bangladesh to follow the business strategies of Japan when they were at introduction stage of adopting 3G services in 2009. The development of such market attributes as control over billing and payment systems may provide an opportunity for expanding the Bangladesh entertainment market. The recent addition of four new telecom operators in Bangladesh's 3G market has created a competitive and challenging field in mobile service provision. This phenomenon demands the correct marketing strategy for attracting customers. The findings of this study help in this direction.

The next study represents an attempt to find out the similarities and differences among the factors that influence the intention to use of mobile entertainment services among Japan 2009, Bangladesh 2014 and Japan 2014. This study makes an important contribution to the user behavior literature, because it is one of the first attempts to explain mobile entertainment service adopt similarly by both a cross-country context (Japan 2009 and Bangladesh 2014) and differently by cross-temporary context (Japan 2009 and Japan 2014). This study finding can be used by service developers to devise appropriate service

strategy to strengthen their products and design recommendations and improve interfaces and technologies for the potential users in Bangladesh 2014. At the early moments of adoption of smartphones and 3G services in Japan 2009 and Bangladesh 2014, we found factors' concerning perceived value was an effective factor on intention to use. Whereas at the later moment of adoption of smartphones and 3G/4G services in Japan 2014, we found factors' concerning perceived behavioral control is an effective factor on intention to use. We strongly recommend an increased focus on the effects of perceived value and perceived behavioral control in future research. This study suggests that this TAM-TPB is fairly efficient as a model to predict the behavioral intention to use mobile entertainment services among global young and cross temporal researches. Concerning the impact of perceived value, perceived behavioral control and attitude on intention to use mobile entertainment services, the interaction between the later-emerging market and early-emerging market dimensions leads to choices on what factors need to be customized to a given market. However, the model of intention to use mobile entertainment service may vary across different life cycle stage of mobile information services. Therefore, future studies by researchers should classify into more understanding of user's perceived value, perceived behavioral control and attitude towards intention to use mobile entertainment services in a developed and developing society that highlights the earlier and later moment of mobile information service adoption. Identification of such structural differences may provide an opportunity for expanding similar markets internationally after adjusting time differences.

6.3.2 Implication and Recommendation from Social Outcome, Quality of life (QoL) Study

Since the first study confirmed mobile information, entertainment, communication and low penetration services' needs structure for Japan 2008 and 2009. The last study tries to understand how the mobile information services are improving the needs of user's life by contribution in their QoL. This study firstly provides a framework to understand the contribution of mobile information services to young's quality of lives from the perspective of its actual usage. The life domains proposed and verified in our study can be used in future studies, to evaluate the potential of mobile information services to contribute to young user's QoL. The study has several implications. First, it was noted that six significant individual life domains, specifically relevant to mobile computing environments that contribute in multiple ways to various facets of a young user's life. We recommend focusing on these life domains for young mobile users. Second, it verifies the reliability and the convergent, divergent, and nomological validity of the original and our newly proposed life domains and through an empirical study. These life domains can be used in future studies to measure mobile information services contribution to QoL. If a firm intends to specialize in a specific life domain for young users, these findings on contribution of mobile information services to QoL can indicate what services will be used, with what goals, in what contexts, and can thus suggest which services will most improve QoL for their users. As long as the mobile company serves its young users' well and is profitable in the long run. Also, the focus of mobile company is not on one service but the company's service line. This is because not every service can sustain a healthy profit by itself. Some services act to complement others. Therefore, the total configuration of the mobile information service

line should be accountable to long-term profits not each individual service.

This study finding will help mobile marketing manager to make decisions related to product, price, place, and promotion. This study has successful in identifying specific significant dimensions of well-being (Cultural, leisure, work, educational, informational and friend lives) of mobile information service usage behaviors that allows young segments to improve their quality of life, a recommendation to the mobile marketer's is to offer more information, entertainment and communication related mobile services to match with the cultural, leisure, friend, work, informational and educational needs of young segment. Another recommendation can be mobile marketer should rise to this challenge and adopt research techniques and methods from both user economics and marketing to determine price levels that are balanced in user affordability and marketer long-term profitability in theses specific dimensions of cultural, leisure, friend, work, informational and educational needs of young segment. This study method can be applied for other country or cultural context to find out whether mobile users are adopting mobile information services differently in their specific needs dimensions. Another recommendation to the mobile marketer can be to make every attempt to represent the significant impact of mobile information services on these specific life dimensions for young as accurately as possible. Mobile marketers can do promotional advertising to the young user or recruit a celebrity endorsement based on actual use of the mobile information services. The results on the relationship between Domain-Specific Contribution of mobile information services to QoL and Overall Contribution of mobile information services to QoL will also help companies allocate resources to the life domains that bear most strongly on overall QoL. A technology used in as many contexts as mobile information services can enhance its users' lives in

numerous ways. To assess those contributions, however, it is need to know how they focused on specific tasks and functions for different user segments. This study takes a step in that direction by offering a practical basis for measuring the contributions of mobile information services to QoL for young mobile information services' users. This study recommends that mobile marketing professionals use the following constructs and measures to monitor the health of mobile industry in a regular basis. The health of the mobile industry can be monitored on an annual basis by using a national survey selected from the mobile users.

The managerial implications of these studies are paramount to mobile service marketing managers. The result shows that mobile service marketing performance can be measured not only through business profitability by increasing adoption/acceptance/intention behaviour of user but also through the kind of customer life's improvement that is enduring and contributing to QoL. The results show some constructs those have influence on user's behavioural intention to use mobile information services and also improve the quality of user's life by using mobile information services. Concerted effort should be made by the mobile marketing managers to encourage the service development concentrate on these construct for mobile information services. The mobile information services those have found to enhance improve user's life should be further developed and marketed for the young.

6.4 Weakness

The boundaries of the present study can be described from different angles. With respect to the generalized ability of its findings, I could not exclude the impact of country-specific factors such as governmental legislation and other regulations. Controls on these effects

could lead to cross-cultural studies. However, this might prove difficult because regulations were not enforced simultaneously in the considered countries, and the rate of development was not equal. And it is not clear whether the study concept can be applied to other countries. We recommend an increased focus on the importance of age, gender, culture and economic characteristics in future research.

Most of the surveys were for young students with good educations and knowledge of technology and moreover, our respondents were clustered on males. They are also convenience samples. Thus, the interpretation of the results will be biased if I attempt to extend them to the entire population or to estimate the market size. Future analyses should use random sampling data. However, the result is still useful for catching the trends in the emerging mobile information service market among young adults, who are innovator groups (i.e. university students), which have not been available. Identifying emerging trends is very important for this rapidly moving market because firms will lose business opportunities if they wait until the representative data become available. While using a young sample is appropriate for this study; however, this may reduce its external validity. Sampling techniques allowing the estimation of the adoption of mobile information services in the general population and using the random sampling data should be applied through nationwide surveys and longitudinal studies.

6.5 Future Research Directions

For better implementation of the use mobile information services, future research could take several new directions:

This thesis finds out some important predictors of behavioural intention to use mobile entertainment services for Bangladesh. To more completely explore these predictors,

decompose these into more specific dimensions can be analyzed in future. As similar to decomposed TPB model by Taylor and Todd (1995) where attitude was decomposed in relative advantages, complexity and compatibility, subjective norm was decomposed in peer and superior influence and perceived behavioural control was decomposed in self-efficacy and facilitating conditions. The decomposition of this study constructs may incorporate additional factors those may reflect a variety of underlying dimensions such as decomposing perceived value into relevant subsets as charging price and speed quality and perceived behavioural control into subsets as organizational and technical support systems. It may provide a complete and clear understanding to use mobile entertainment services in Bangladesh. To further examine the applicability of the TAM-TPB framework, this study recommends more research on the three factors for intention to use mobile entertainment services in different cultural contexts, especially in developing countries.

This study identified the importance of appropriateness of sample characteristics such as gender, age, and culture/economy for QoL research in case of Japan. This study recommends an increased focus on the importance of age, gender, culture and economic characteristics in future research. To further examine the applicability of the bottom-up spillover theory framework, this study recommends more research on the contribution of mobile information services to improve the QoL in different cultural contexts, especially in developed countries.

This study concentrates on the relationship with the domain-specific contribution of mobile information services to QoL and overall contribution of mobile information services to QoL. Future studies need to addressed on the positive experience contribution with mobile information services in a given life domain will increase the significantly found

domain-specific contributions of mobile information services to QoL. Ten motivationally distinct basic values (power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity and security) which include all the core values recognized in cultures around the world can be used as a control variable to account for potential cultural effects on the contribution of mobile information services to improve the QoL.

Methodologically, it would be useful for future research to evaluate hierarchical modeling by comparing the performance between component-based SEM (PLS) and covariance-based SEM under different research conditions.

Several directions for future research stem from the research directions above mentioned. First of all, it is desirable in the near future to extend this study to other samples and different cultural backgrounds. Second, the use of discussion groups and in-depth interviews with mobile users should be employed in order to have different types of data to be compared, and thus, allow to deepen in my knowledge of the complex relationships among the variables studied in this study. This study simplifies the user market mechanism of mobile information services' usage with the effect of economic (acceptance of mobile information services) and social (QoL) outcome variables. Further study need to find out the relationship between the predictors of acceptance, i. e., behavioural intention and QoL for mobile information service usage for Japan by a statistical analysis. In this sense, the analysis of the relationships among the constructs of behavioural intention for Japan 2014 and QoL for Japan 2013 explored in this study for mobile information services is still need to be done (see Figure 19). Structural equation models should be used with this purpose.

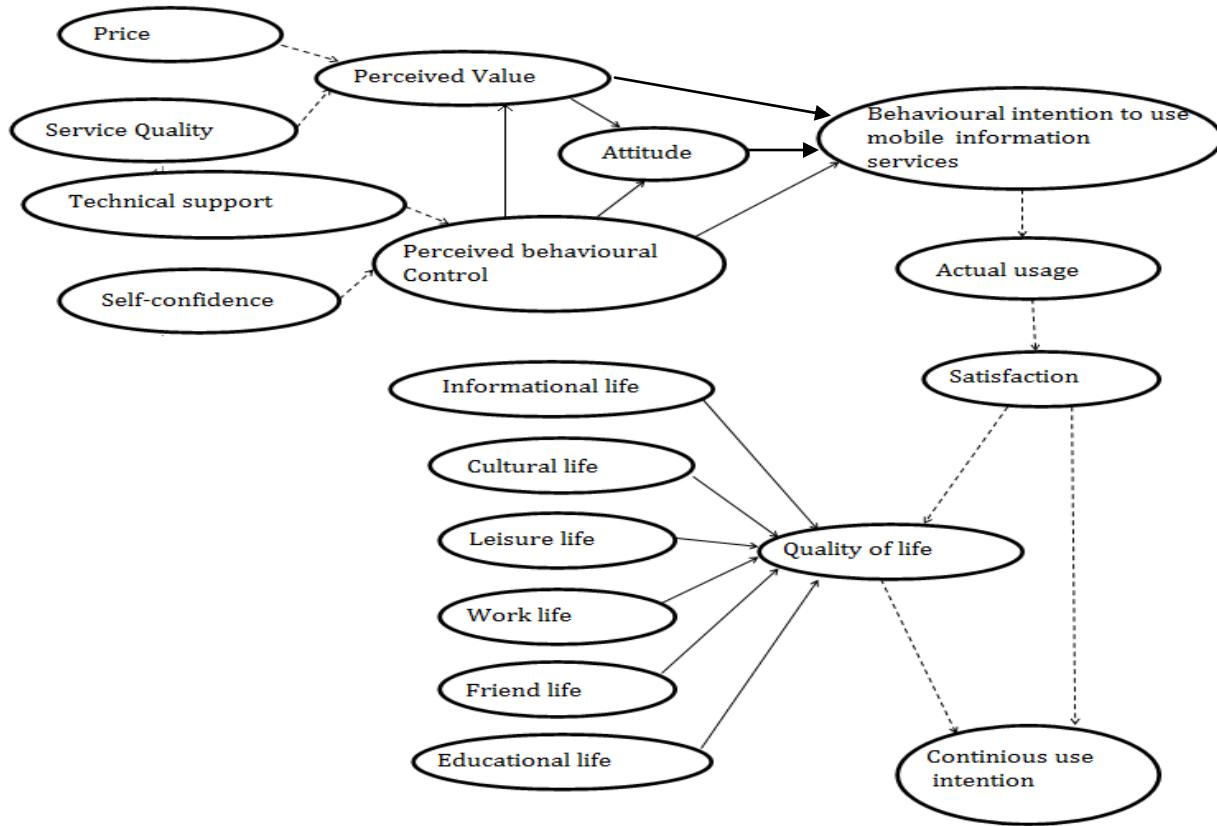


Figure 19. Relationships found among the constructs explored in this study (continuous-line arrows) and hypothetical related constructs (dot-line arrows) to be explored in the future.

6.6 Conclusion

The objective of this study was to identify the dimensions of mobile information service acceptance by modeling the impact of behavioural intention and quality of life in the context of developed and developing countries. In order to serve the objective, a systematic literature review on mobile information services usage behavior was undertaken. Using the literature on behavioural intentions and quality of life, a conceptual framework and a set of hypotheses were developed. The research models were specified as a TAM-TPB model and bottom-up spillover hierarchy model. Sample sets were analyzed to test these conceptual

models. The study applied covariance based and partial least square path modeling to estimate the adoption and hierarchical models and test the relationships among constructs. The findings of the study confirmed adequate measurements and structural properties of the research models, proving some significant hypotheses.

Market practitioners and researchers have recognized the importance of both social (QoL) and economical (acceptance of mobile information services) outcomes of mobile marketing. Akin to behavioural intentions, which represent the economic outcome (acceptance of mobile information services) of mobile service usage evaluation, quality of life represents the social outcome of the mobile service usage evaluation process. Behavioural intention and QoL were found to represent outcome variables of mobile information service evaluation in this study. Limited research has addressed the simultaneous impact of mobile information services provision on both economic and social outcomes. The research models developed and tested in this study begins to address this gap. The bottom-up spillover hierarchy and the TAM-TPB models reflect the customer's use of the mobile services to achieve well-being of customers, as well as the benefits the mobile companies gain through positive behavioural intentions. This study extends previous research on mobile information service usage decision making by examining the antecedents of behavioural intention and quality of life (QoL). This understanding makes an important contribution to mobile information services theories. The study findings have significant potential improving the financial performance of mobile service providers and QoL of mobile information service users.

This study makes an important contribution to the user behavior literature, because it is one of the attempts to explain mobile entertainment service adoption in a cross country

and cross-temporal contexts. Despite increasing empirical research, there is a serious lack of studies that multiple mobile entertainment service applications. This study serves as one of the pioneering attempts in this area. This suggests that this TAM-TPB is fairly efficient as a model to predict the behavioral intention to use mobile entertainment services among global young segment. The economic outcome (the acceptance of mobile information services) from this study revealed that the TAM-TPB model with attitude, perceived behavioral control and perceived Value could be applied to understand young behavioral intention to use mobile entertainment services. However, perceived fun and perceived convenience were not supported, possibly in developing countries. The model of intention to use mobile entertainment service may have similarities among young segments across border and may vary across different life cycle stage of mobile information services. Therefore, concerning the impact of perceived value, perceived behavioral control and attitude on intention to use mobile entertainment services, the interaction between the later-emerging market and early-emerging market dimensions leads to choices on what factors need to be customized to a given market. Identification of such structural differences may provide an opportunity for expanding similar markets internationally after adjusting the technology diffusion timing.

This study deals with the interface of adoption behavior of users and their quality-of-life. Mobile Marketers act as user behavioral scientists in studying how users are influencing to intent to use mobile information services. The results of this study can suggest some crucially key factors. These key factors can be manipulated the influencing behavior and QoL of current and potential users of mobile information services. Based on the study findings concentrate on influence of attitude, perceived value and perceived behavioural

control on behavioural intention, marketers need to identify strategic gaps to provide effective mobile information services facilitating use by young segments. This study finding also argues that mobile marketing has an extremely important role in the enhancement of the quality-of-life through assessing users' needs on cultural, leisure, friend, work, informational and educational life aspects and guiding the forces of service development in improving the needs in those dimensions. The contribution of the study lies in providing critical insights in customer's usage behaviour mechanism research in mobile information service systems by modeling its effects on economic or organizational (i.e., acceptance or adoption) and social (i.e., quality of life) outcomes. These relationships of the research model are based on adequate logical (i.e., theory is internally consistent) and empirical (i.e., robust findings) evidence. Overall this study clearly indicates the importance of user decision-making in contributing to the quality of life and customers' behavioural intention perspectives.

Appendix

Appendix 1. Questionnaire items used in 1st, 2nd and 3rd themes/objectives for mobile information/entertainment (game, music, ringtone) services:

1. Behavioral intention to use: in 1st, 2nd and 3rd themes (adapted from Kondo and Ishida, 2014)

Either (1) 'Do you have the intention to use the following mobile information/ entertainment service on a continuous basis?' or

(2) 'Do you have the intention to use the following mobile information/ entertainment service in the future?'

(3) Please rate the intention to use for the following information/ entertainment services.

2. Attitude towards mobile entertainment services: in 2nd and 3rd themes (adapted from Kondo and Ishida, 2014; Celik and Yilmaz, 2011)

(1) 'Overall, mobile entertainment services are important to me'.

(2) 'Overall, mobile entertainment services can satisfy different needs of mine'.

(3) 'Using mobile entertainment services are beneficial to me'.

3. Subjective norm: in 2nd and 3rd themes (adapted from Kondo and Ishida, 2014)

(1) 'People important to me think I should use mobile entertainment services (family members, lovers, friends, your boss etc)'.

(2) 'It is expected that people like me to use mobile entertainment services'.

(3) 'People I look up to expect me to use mobile entertainment services'.

4. Perceived Behavioural control in 2nd and 3rd themes (adapted from Kondo and Ishida, 2014)

Items: (1) 'I feel free to use the kind of mobile entertainment services I like to'.

(2) 'Using mobile entertainment services is entirely within my control'.

(3) 'I have the necessary means and resources to use mobile entertainment services'.

5. Perceived value in: 2nd and 3rd themes (adapted from Kondo and Ishida, 2014;

Boontarig et al. 2012)

(1) 'Please rate the quality of mobile entertainment services given the prices you pay'.

(2) 'Please rate the prices of mobile entertainment services given the quality you receive'.

(3) 'Mobile entertainment services have an acceptable standard of quality'.

6. Perceived ease of use: in 2nd theme (adapted from Okazaki et al. 2008)

(1) 'I find the following mobile entertainment services are user friendly'. Please rate each service by checking.

(2) 'I find it easy to use the following mobile entertainment services'. Please rate each service by checking.

(3) 'I find to use the following mobile entertainment services, I don't have to be technology expert'. Please rate each service by checking.

7. Perceived fun: in 2nd theme (adapted from Okazaki et al. 2008)

(1) 'I find the following mobile entertainment services very entertaining'.

(2) 'My cell phone doesn't just display games, play music and ringtones –it really entertains me'.

(3) 'Using the following mobile entertainment services is truly a joy'.

8. Perceived convenience: in 2nd theme (adapted from Okazaki et al. 2008)

(1) 'The mechanism associated with the following mobile entertainment services is truly functional'.

(2) 'I find the following mobile entertainment services very practical'.

Appendix 2. Survey Questionnaire in the 4th theme/objective to know how mobile information services improve QoL

A.2.1 Overall, how do you feel about mobile information services (MIS) and the overall Quality of Life?

Overall Contribution (ideal; improvement; satisfaction and achievement)	Items
	1) Using the MIS helps me make my life close to ideal. 2) Using the MIS improves the general conditions of my life. 3) Using the MIS helps make my life more satisfying. 4) Using the MIS helps me achieve important things in my life.

(A.2.2) Original individual life domains from Choi et al. (2007a)

Original Life Domains	Items
Cultural	1) Purchasing movie or concert tickets over the MIS whenever I want, improves my cultural life; 2) Making reservations for movies and concerts through the MIS while I am out improves my cultural life; 3) Getting discount vouchers through the MIS before going to a restaurant or cinema improves my cultural life; 4) Getting movie information through the MIS on the street improves my cultural life; 5) When it's too bothersome to go to the cinema, reserving tickets through the MIS improves my cultural life.
Leisure	1) Using the MIS to lift my spirits when I am gloomy improves my leisure life; 2) Using the MIS to spend my spare time while I am out helps my leisure life; 3) MIS help me to stay close with my personal interests, preferences and hobbies which improves leisure life.
User	1) Frequently checking prices through the MIS while I am shopping improves my life as a user; 2) Buying goods through the MIS instead of actually going out for shopping improves my life as a user; 3) Searching for information on goods I want to buy through the MIS, improves my life as a user; 4) Exchanging goods over the MIS improves my life as a user.
Financial	1) Using the MIS to send money electronically to another person when I am away improves my financial life; 2) Using the MIS to check my bank account improves my financial life; 3) Using the MIS to buy and sell stocks/options instantly improves my financial life; 4) Making reservations for trains with low commissions on the MIS improves my financial life.
Health	1) Recording health data daily through the MIS improves my health life; 2) Using the MIS to take the medical advice when I can't use a PC improves my health life; 3) Instead of going to the clinic or hospital, making an appointment by the MIS will improve my health life.

A.2.2 Original individual life domains from Choi et al. (2007a) (Cont.)

Original Life Domains	Items
Safety	1) Using the MIS to search my location when I get lost at a strange place improves my personal safety; 2) Searching for a safe route to my destination through the MIS late at night improves my personal safety; 3) Being in contact with other people through the MIS when I am alone improves my personal safety.
Family	1) When I am concerned about my family members, searching for their current location using the MIS improves my family life; 2) Getting in touch with my family members through the MIS to relieve their worries improves my family life; 3) Sending photos to my family over the MIS help my family life; 4) To be in constant contact with my family when I am away improves my family life.
Friend	1) Frequently sending photos to friends over the MIS improves my friendships; 2) Frequently contacting friends through the MIS improves my friendships; 3) Congratulating friends on their birthday over the MIS improves my friendships.
Self	1) Using the MIS to share my own photos with others improves my self-expression; 2) Immediately upgrading to the latest services over the MIS increases my self-esteem.
Community	1) Informing members of on-line community meeting dates over the MIS, improves my community life; 2) Checking bulletin boards and e-mail from the on-line community over the MIS improves my community life.
Work	1) Searching for recruiting information through the MIS helps my work life; 2) Discussing job-related issues with co-workers through the MIS helps my work life; 3) Working through the MIS when I can't use a PC helps my work life

A.2.3 Proposed individual life domains

Proposed Life Domains	Items
Trustworthy	1) Having trust on the Internet services by MIS, improves my trustworthy life; 2) Having trust on paying for the on-line shopping via MIS, will improves my trustworthy life; 3) Having trust on MIS while I am reading, entertaining and getting information via Internet, will improves my trustworthy life.
Informational	1) MIS helps me to get information of news, weather, maps, etc. when I need which improves my information life; 2) I can search personal information through MIS when I need which improves my personal life; 3) at anytime, anywhere, be searching information at anytime, anywhere by the MIS is fully useful in order to improve my informational life
Home-healthcare	1) Using MIS to monitor blood pressure, glucose level, weight, food calorie etc. by own self when I am home, improves my health life; 2) Using MIS in home for diet control and medication agenda, etc., improves my health care
Educational	1) Translate words through mobile dictionary anywhere anytime, improves my educational life; 2) Reading newspapers, E-books through MIS, improves my educational life; 3) to see the education program by the MIS when I cannot use the PC, will improves my educational life.

Appendix 3. A brief description on structural equation modeling (SEM)

A.2.1 Structural Equation Modeling

Structural equation modeling (SEM) has seen a dramatic rise in attention and utilization across a variety of scientific disciplines such as strategic management (Shook et al. 2003), marketing (Chin, Peterson, and Brown, 2008) and psychology (MacCallum and, 2000) over the last decade (Hair, Ringle, and Sarstedt, 2011b). Structural equation modeling (SEM), a second-generation statistical method, is a widely used analytical tool in marketing research (Babin, Hair and Boles, 2008).

In marketing research there is an increasing need to assess complex multiple latent constructs and relationships. Second-order constructs can be modeled providing an improved theoretical understanding of relationships as well as parsimony. SEM in particular is well suited to investigating complex relationships among multiple constructs. Statistically, SEM represents an advanced version of general linear modeling procedures (e.g., multiple regression analysis), and is used to assess “whether a hypothesized model is consistent with the data collected to reflect the theory” (Lei and, 2007). The specification of the SEM should be heavily guided by theory, identifying predictors, mediators, and outcomes. The full SEM consists of two parts, structure equation model and measurement model.

The Structural Model

Consider random vectors, $\eta' = (\eta_1, \eta_2, \dots, \eta_m)$ and $\xi' = (\xi_1, \xi_2, \dots, \xi_m)$ of latent dependent and independent variables, respectively, and the following system of linear structural relations:

$$\eta = B\eta + \Gamma\xi + \zeta$$

where, B ($m \times n$) and Γ ($m \times n$) are coefficient matrices and $\zeta' = (\zeta_1, \zeta_2, \dots, \zeta_m)$ is a random vector of errors in equations (random disturbance terms).

The Measurement Model

The elements of B represent direct causal effects of η variables on other η variables and the elements of Γ represent direct causal effects of ξ variables on ξ variables. It is assumed that ζ is uncorrelated with ξ and that $I - B$ is nonsingular. The vectors η and ξ are not observed; instead vectors $y' = (y_1, y_2, \dots, y_p)$ and $x' = (x_1, x_2, \dots, x_q)$ are observed such that,

$$y = \Lambda_y \eta + \varepsilon, \quad \text{and}, \quad x = \Lambda_x \xi + \delta$$

where, ε and δ are vectors of errors of measurement in y and x , respectively. The matrices $\Lambda_y (p \times m)$ and $\Lambda_x (q \times n)$ are regression matrices of y on η and of x on ξ respectively. It is convenient to refer to y and x as the observed variables and η and ξ as the latent variables. The errors of measurement are assumed to be uncorrelated with η , ξ , and ζ , but may be correlated among themselves.

While SEM is a general term encompassing a variety of statistical models, covariance-based SEM (CB-SEM) is the more widely used approach in SEM, and many researchers simply refer to CB-SEM as SEM. This reference is naïve; however, because partial least squares (PLS) is also a useful and increasingly applied approach to examine structural equation models (Hair et al. 2012).

In the context of SEM, the CFA is often called ‘the measurement model’, while the relations between the latent variables (with directed arrows) are called ‘the structural model’. CFA is also frequently used as a first step to assess the proposed measurement model in a structural equation model. Many of the rules of interpretation regarding

assessment of model fit and model modification in structural equation modeling apply equally to CFA. CFA is distinguished from structural equation modeling by the fact that in CFA, there are no directed arrows between latent factors. In other words, while in SEM factors are not presumed to directly cause one another, SEM often does specify particular factors and variables to be causal in nature.

Confirmatory Factor Analysis (CFA)

CFA is used to test whether measures of a construct are consistent with a researcher's understanding of the nature of that construct (or factor). As such, the objective of confirmatory factor analysis is to test whether the data fit a hypothesized measurement model. This hypothesized model is based on theory and/or previous analytic research.

Two aspects in CFA that need to mention are Kaiser-Meyer-Olkin and Bartlett's test.

Bartlett's Sphericity Test

The Bartlett's test checks if the observed correlation matrix $R = (r_{ij})_{p \times p}$ diverges significantly from the identity matrix (theoretical matrix under H_0 : the variables are orthogonal). In order to measure the overall relation between the variables, we compute the determinant of the correlation matrix $|R|$. Under H_0 , $|R| = 1$; if the variables are highly correlated, we have $|R| \approx 0$. The Bartlett's test statistic indicates to what extent we deviate from the reference situation $|R| = 1$. It uses the following formula.

$$\chi^2 = (n-1 - \frac{2p+5}{6}) \times \ln |R|$$

Under H_0 , it follows a χ^2 distribution with a $[p \times (p-1) / 2]$ degree of freedom.

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO)

The KMO index compares the values of correlations between variables and those of the partial correlations. The partial correlation matrix can be obtained from the correlation

matrix. We calculate the inverse of this last one $R^{-1} = (v_{ij})$, and we compute the partial correlation $A = (a_{ij})$ as follows:

$$a_{ij} = - \frac{v_{ij}}{v_{ii} \times v_{jj}}$$

The overall KMO index is computed as follows.

$$KMO = \sum_i \sum_{j \neq i} r_{ij}^2 / (\sum_i \sum_{j \neq i} r_{ij}^2 + \sum_i \sum_{j \neq i} a_{ij}^2)$$

If the partial correlation $A = (a_{ij})$ is near to zero, $KMO \approx 1$.

It is absolutely necessary to establish convergent and discriminant validity, as well as reliability, when doing a CFA.

Convergent Validity and Discriminant Validity

Convergent validity can be established if two similar constructs correspond with one another, while discriminant validity applies to two dissimilar constructs that are easily differentiated.

Average Variance extracted (AVE) > 0.5

AVE $>$ Squared inter-construct correlations (SIC)

$$AVE = \sum_{i=1}^n \lambda_i^2 / n$$

λ_i^2 is squared factor loadings and n is the number of the items

Construct's Reliability

Composite Reliability (CR)

For having composite reliability, all constructs have to have good internal consistency. So, CR has to be > 0.7 .

$$CR = (\sum_{i=1}^n \lambda_i)^2 / ((\sum_{i=1}^n \lambda_i)^2 + (\sum_{i=1}^n \delta_i))$$

δ_i = error variances of each indicator ($1 - \lambda_i^2$).

Cronbach's α (alpha)

In statistics, Cronbach's α (alpha) is used as a (lower bound) estimate of the reliability of the constructs. It has been proposed that α can be viewed as the expected correlation of two tests that measure the same construct. By using this definition, it is implicitly assumed that the average correlation of a set of items is an accurate estimate of the average correlation of all items that pertain to a certain construct. Cronbach's α is a function of the number of items in a test, the average covariance between item-pairs, and the variance of the total score.

Suppose that we measure a quantity which is a sum of K components (*K-items*): $X = Y_1 + Y_2 + \dots + Y_k$. Cronbach's α is defined as:

$$\alpha = \frac{K}{K-1} \left(1 - \frac{\sum_{i=1}^K \sigma_{Y_i}^2}{\sigma_X^2} \right)$$

where σ_X^2 is the variance of the observed total test scores, and $\sigma_{Y_i}^2$ is the variance of component i for the current sample of persons (Bonett, 2003).

A.2.1.1 Covariance Based Structural Equation Modeling

According to Hair et al. (2010), CB-SEM is used to evaluate focuses on goodness of fit which is focusing on minimization of the discrepancy (differences) between the observed covariance matrix and the estimated covariance matrix. Its application is suggested appropriate to testing and confirmation where prior theory is strong or have a good reason to do so. However, the researchers or practitioners should achieve the assumption when conducting CB-SEM. Moreover, structural models can be complex and interactive effects can be assessed when using CB-SEM. When CB-SEM is executed the error terms are

modeled for each indicator and loadings of the individual indicator are obtained. This enables elimination of indicators with large error terms and/or low loadings, thus improving the quality of the latent constructs modeled. Specifically, the confirmatory factor analysis (CFA) stage of CB-SEM allows all latent constructs to cover mutually and thereby permits quantitative assessment of both convergent and discriminant validity for each construct. The objective of the process of eliminating high measurement errors and lower loading items is to obtain a model with an acceptable fit between the observed and estimated models so that structural models can then be assessed.

In CB-SEM, the Maximum Likelihood (ML) estimation method is usually employed to give parameter estimates such that the covariance matrix of the theoretical model is as close as possible to the sample covariance matrix. The ML estimates are obtained by means of an iterative procedure which minimizes a definite fitting function by successively improving the parameter estimates starting with the initial estimates.

For example, one may be interested in the heights of adult female penguins, but be unable to measure the height of every single penguin in a population due to cost or time constraints. Assuming that the heights are normally distributed with some unknown mean and variance, the mean and variance can be estimated with MLE while only knowing the heights of some sample of the overall population. MLE would accomplish this by taking the mean and variance as parameters and finding particular parametric values that make the observed results the most probable (given the model).

ML yields estimates that seek to maximize the likelihood that the observed data come from a population consistent with the implied model. An advantage of ML is that it is a full-information method, which means that all of a model's parameter estimates are calculated

simultaneously. The fit function of an estimation method is the statistical criterion the method aims to minimize; in ML, the fit function is the difference in covariance between the observed data and the population data specified by the model being estimated. The ML fit function is represented as,

$$F_{ML}(\hat{\theta}) = \log|\Sigma(\hat{\theta})| + \text{tr}(S \Sigma(\hat{\theta})^{-1}) - \log|S| - (p + q)$$

where $\Sigma(\hat{\theta})$ is the covariance structure (a composite of the covariance matrix of the predictor, the covariance matrix of the criterion, and the covariance matrix of the predictor with the criterion), $\hat{\theta}$ are estimated parameters, tr is the trace of a matrix, S is the covariance matrix observed in the data, θ^{-1} is the inverse of a matrix θ , p is the number of observed indicators for the endogenous latent factors, and q is the number of observed indicators for the exogenous latent factors. ML uses an iterative process of estimating parameter values until the fit function is optimized.

A.2.1.2 Partial Least Square (PLS) Structural Equation Modeling

PLS analysis differs from CBSEM in that it works not with latent but with block variables, which are derived as weighted composites of their associated observed variables and are, hence, considered as observable themselves (Rigdon, 2005). The PLS estimation approach essentially consists of an iterative sequence of OLS regressions that starts with an outside approximation, during which the latent variables of the model are approximated by a linear combination of their indicators. For this process, a set of weights is determined in a manner similar to principal component analysis for reflective and regression analysis for formative indicators. In the next step, the inside approximation, alternative case values are determined as weighted means of those block variables that are adjacent within the structural model. Because of its two-step process (instead of simultaneous estimation of all

parameters), PLS is often viewed as more appropriate for exploratory work than for confirmatory modeling, and the coefficients it predicts are often consistent but biased compared to other estimation methods. Three different methods for estimating PLS weights are available (i.e., factor, path, and centroid weighting schemes), but previous research indicates that the differences in the results produced by these different methods are negligible. Instead of estimating the measurement and structural models simultaneously, PLS works by first estimating blocks of variables and relationships from the measurement model, and then estimates the structural model.

The Structural Model

In the structural model, also called inner model, the latent variables are related with each other according to substantive theory. Latent variables are divided into two classes, exogenous and endogenous (Monecke and Leisch, 2012). For the benefit simplicity the notation we use for the structural model dismisses the difference between exogenous variables (ξ) and endogenous variables (η).

$$R = RB + \zeta, \quad R = (\eta, \xi)' \text{ and } E[\zeta] = 0$$

The Measurement Model

The measurement model or outer model relates observed variables to their latent variables. Often observed variables are referred to as manifest variables or indicators, latent variables as factors. Within the PLS framework one manifest variable can only be related to one latent variable. All manifest variables related to one latent variable are called a block. So each latent variable has its own block of observed variables. A block must contain at least one manifest variable. The way a block can be related to a latent variable can be either reflective or formative (Roy et al. 2012).

Without loss of generality I can make the following assumptions:

1. All manifest variables contained in the data matrix X are scaled to have zero mean and unit variance.
2. Each block of manifest variables X_g is already transformed to be positively correlated for all latent variables y_g , $g=1, \dots, G$.

Reflective Measurement:

In the reflective way each block of manifest variables reflects its latent variables and can be written as the multivariate regression:

$$X_g = y_g \omega_g^T + \varepsilon_g, \quad \text{and } E[\varepsilon_g | y_g] = 0$$

So ω_g^T can be estimated by least squares as

$$\begin{aligned} \hat{\omega}_g^T &= (y_g^T y_g)^{-1} y_g^T X_g \\ &= \text{VAR}(y_g)^{-1} \text{COV}(y_g X_g) \\ &= \text{COV}(y_g X_g) \\ &= \text{COR}(y_g X_g) \end{aligned}$$

All the latent variables y_g , $g = 1, \dots, G$, as linear combination of their manifest variables under the constraint to have unit variance. We assumed all the manifest variables to be scaled to zero mean and unit variance. Consequently, the equality above is valid (Monecke and Leisch, 2012).

Formative Measurement:

For the formative way the latent variable is considered to be formed by its manifest variables following a multiple regression:

$$y_g = X_g \omega_g + \delta_g, \quad \text{and } E[\delta_g | X_g] = 0$$

Again ω_g is estimated by least squares:

$$\begin{aligned}\hat{\omega}_g &= (X_g^T X_g)^{-1} X_g^T y_g \\ &= \text{VAR}(X_g)^{-1} \text{COV}(X_g y_g) \\ &= \text{COR}(X_g)^{-1} \text{COV}(X_g y_g)\end{aligned}$$

PLS relies on a type of ordinary least squares (OLS) regression to determine parameter estimates. Ordinary least squares (OLS) is a method for estimating the unknown parameters in a linear regression model, with the goal of minimizing the differences between the observed responses in some arbitrary dataset and the responses predicted by the linear approximation of the data (visually this is seen as the sum of the vertical distances between each data point in the set and the corresponding point on the regression line - the smaller the differences, the better the model fits the data). The resulting estimator can be expressed by a simple formula, especially in the case of a single regressor on the right-hand side.

The OLS estimator is consistent when the regressors are exogenous and there is no perfect multicollinearity, and optimal in the class of linear unbiased estimators when the errors are homoscedastic and serially uncorrelated. Under these conditions, the method of OLS provides minimum-variance mean-unbiased estimation when the errors have finite variances.

Suppose the data consists of n observations $\{y_i, x_i\}^n = 1$. Each observation includes a scalar response y_i and a vector of p predictors (or regressors) x_i . In a linear regression model the response variable is a linear function of the regressors:

$$y_i = x_i^T \beta + \varepsilon_i,$$

where β is a $p \times 1$ vector of unknown parameters; ε_i 's are unobserved scalar random variables (errors) which account for the discrepancy between the actually observed responses y_i and the "predicted outcomes" $x_i^T \beta$ and T denotes matrix transpose, so that $x^T \beta$ is the dot product between the vectors x and β . This model can also be written in matrix notation as,

$$y = X \beta + \varepsilon,$$

Where y and ε are $n \times 1$ vectors, and X is an $n \times p$ matrix of regressors, which is also sometimes called the design matrix. As a rule, the constant term is always included in the set of regressors X , say, by taking $x_{i1} = 1$ for all $i = 1, \dots, n$. The coefficient β_1 corresponding to this regressor is called the *intercept*.

A.2.1.3 CB-SEM Vs. PLS-SEM

PLS analysis is particularly suited to cases in which CB-SEM reaches its limits, such as when the number of indicators per latent variable becomes excessively large or when the sample size is small. Basically, each constructs should have more than three items (indicators) in order to avoid the identification problem in CB-SEM. Only the reliable and valid variance is useful for testing causal (direct) relationships. It means that, the structural model cannot be conducted when prior of reliability and validity cannot be achieved. Thus, partial least square SEM (PLS-SEM) has been established to solve this problem. Its application is aimed to maximize the explained variance of the endogenous latent constructs (dependent variables) and minimize the unexplained variances.

PLS method has several advantages which include the normality of data distribution not assumed. It means that, the data with non-normal can be conducted in structural equation modeling since its application is performed by the non-parametric method. Besides,

indicators (items) with fewer than three for each constructs could be carrying on since the identification issues have been overcome. In addition, this model can be including a larger number of indicator variables even higher than 50 items. Instead, CB-SEM just accepts several indicator variables to conducting the analysis since its limited. PLS-SEM has more exploratory characteristics but CB-SEM has more testing and verifying characteristics. So PLS-SEM has been chosen when theories aren't well developed or matured. Because discriminating between exploratory and confirmatory researches is very challenging and isn't as straightforward as it looks, this criteria needs specific attention. Another criterion is that PLS-SEM handles more complex models, more easily and very more efficiency. CB-SEM need a lot more sample size, but PLS-SEM can converge with smaller sample sizes.

Here I will try to evaluate SEM in mobile information service research in particular, by directly using two major approaches to structural modeling – covariance based SEM (CB-SEM) and variance-based SEM (PLS-SEM).

A.2.2 Global Model Fit

The issue of how the model that best represents the data reflects underlying theory, known as model fit, Global model fit is a measure of how well the specified model reproduced the observed matrix of variances and covariances among a set of variables or indicators. Global model fit may be accessed via calculating the comparative model fit, parsimony-corrected fit and informative model fit. Parsimony-corrected fit is often measured with the root mean square error of approximation (RMSEA), informative model fit may be measured by akaike information criteria (AIC) and comparative fit may be measured using the comparative fit index (CFI). Fit indices such as Goodness of Fit Index (GoF), the coefficient of determination (R^2) and predictive relevance (Q^2) are for some non-

ML estimation methods (ordinary least square).

χ^2 (Chi-square)

It derived directly from the “fitting function” (F). Fitting function is one number that represents the fit between the implied and observed covariance matrices. Usually it is the sum of squared differences between the matrices (least squares method), but other functions exist.

$$\chi^2 = F * (N-1)$$

where, F = the value of the fitting function, N = sample size (number of participants). To adjust or account for this, it is recommend dividing χ^2 by the degree of freedom (df), called normed chi-square (NC).

$\chi^2/df \leq 2.0$ (or 3.0 or even 5.0) considered acceptable.

df = number of observations – number of parameters

Comparative Fix Index (CFI)

It compares performance on the model to performance on baseline ("null" or "independence") model. Baseline model assumes zero correlation between all observed variables.

$$CFI = 1 - (\hat{\delta}_{\text{independent model}} / \hat{\delta}_{\text{proposed model}})$$

where, $\hat{\delta} = \chi^2 - df$, df are the degrees of freedom of the model.

Tucker-Lewis index (TLI)

It compares the model to baseline. TLI does have a penalty for adding parameter. It does adjust for df. It can fall outside 0.0-1.0 range.

$$TLI = 1 - \{(\chi^2_{\text{proposed model}} / df_{\text{proposed model}}) / (\chi^2_{\text{independent model}} / df_{\text{independent model}})\}$$

Absolute Fit Indices (GFI and AGFI)

Other indices do not compare to a baseline model -"absolute" indices but goodness of fit (GFI). Adjusted goodness of fit (AGFI) adjusts for numbers of parameters are two measures based on % variance explained. They can fall outside 0.0-1.0 range.

$$GFI = 1 - (\nu_{\text{residual}} / \nu_{\text{total}})$$

ν_{residual} = residual variance in covariance matrix (variance that can't be explained by the model)

ν_{total} = total variance in the covariance matrix.

Root Mean Square Error of Approximation (RMSEA)

It describes Error of Approximation (lack of fit of the model to population data, when parameters are optimally chosen) vs. Error of Estimation (lack of fit of the model with parameters chosen via fitting to the sample data) to population data (with optimally chosen parameters). Error of estimation is affected by sample size, but error of approximation is not.

$$\text{RMSEA} = \sqrt{\hat{\delta}_{\text{proposed model}} / df_{\text{proposed model}} (N - 1)}$$

where, $\hat{\delta}$ = degree of misspecification of the model, N= Sample size.

Akaike information criterion (AIC)

The **AIC** is a measure of the relative quality of statistical models for a given set of data. Given a collection of models for the data, AIC estimates the quality of each model, relative to each of the other models. Hence, AIC provides a means for model selection. AIC is founded on information theory: it offers a relative estimate of the information lost when a given model is used to represent the process that generates the data. In doing so, it deals

with the trade-off between the goodness of fit of the model and the complexity of the model.

A statistical model of some data where L be the maximum value of the likelihood function for the model, k be the number of estimated parameters in the model. Then the AIC value of the model is the following.

$$\text{AIC} = 2k - 2\ln(L)$$

Given a set of candidate models for the data, the preferred model is the one with the minimum AIC value. Hence AIC rewards goodness of fit (as assessed by the likelihood function), but it also includes a penalty that is an increasing function of the number of estimated parameters. The penalty discourages over fitting (increasing the number of parameters in the model almost always improves the goodness of the fit).

Browne-Cudeck criterion (BCC)

The BCC is similar to the AIC. That is, the BCC and AIC both represent the extent to which the observed covariance matrix differs from the predicted covariance matrix--like the chi square statistic--but include a penalty if the model is complex, with many parameters. The BCC bestows an even harsher penalty than does the AIC.

The BCC equals the chi square divided by n plus $2k / (n - v - 2)$. In this formula, $k = .5v/v + 1 - df$, where v is the number of variables and n = the sample size.

R^2 (the coefficient of determination)

R^2 is a number that indicates how well data fit a statistical model – sometimes simply a line or a curve. An R^2 of 1 indicates that the regression line perfectly fits the data, while an R^2 of 0 indicates that the line does not fit the data at all. A data set has n values marked y_1, \dots, y_n (collectively known as y_i), each associated with a predicted (or modeled) value f_1, \dots, f_n (known as f_i , or sometimes \hat{y}_i). If \bar{y} is the mean of the observed data:

$$\bar{y} = \frac{1}{n} \sum_{i=1}^n y_i$$

Then the variability of the data set can be measured using three sums of squares formulas:

The total sum of squares (proportional to the variance of the data):

$$SS_{tot} = \sum_i (y_i - \bar{y})^2$$

The regression sum of squares, also called the explained sum of squares:

$$SS_{reg} = \sum_i (f_i - \bar{y})^2$$

The sum of squares of residuals, also called the residual sum of squares:

$$SS_{res} = \sum_i (y_i - f_i)^2$$

The most general definition of the coefficient of determination is

$$R^2 = 1 - \frac{SS_{res}}{SS_{tot}}$$

$$R^2 = \frac{SS_{reg}/n}{SS_{tot}/n}$$

In this form R^2 is expressed as the ratio of the explained variance (variance of the model's predictions, which is SS_{reg} / n) to the total variance (sample variance of the dependent variable, which is SS_{tot} / n).

The goodness-of-fit index (GoF)

Tenenhaus et al. (2004) propose the GoF as a means to validate a PLS path model globally. The GoF can be understood as the geometric mean of two types of R^2 values' averages: the average variance extracted, i. e. the average proportion of variance explained when regressing the reflective indicators on their latent variables (Fornell and Larcker

1981), and R^2_{inner} , i. e. the average R^2 of the endogenous latent variables. The formula for the GoF can thus be rewritten as:

$$\text{GoF} = \sqrt{\text{average variance extracted (AVE)} \times R^2_{\text{inner}}}$$

Predictive relevance (Q^2)

The PLS path modeling literature treats this Q^2 analysis as a form of cross-validation. In addition to the size of R^2 , the predictive sample reuse technique (Q^2) can effectively be used as a criterion for predictive relevance (Chin, 2010). Based on blindfolding procedure, Q^2 evaluates the predictive validity of a large complex model using PLS. While estimating parameters for a model under blindfolding procedure, this technique omits data for a given block of indicators and then predicts the omitted part based on the calculated parameters. Thus, Q^2 shows how well the data collected empirically can be reconstructed with the help of model and the PLS parameters (Fornell and Cha 1994). The predictive measure for the block is based on the following parameters:

$$Q^2 = 1 - \frac{\sum_D E_D}{\sum_D O_D}$$

where, E = the sum of squares of prediction error, O = the sum of squares error using the mean for prediction, D = Omission distance.

Q^2 can be obtained using two different types of prediction techniques, that is, cross validated communality and cross validated redundancy. The first one is obtained by predicting data points using latent variable score. If the obscured data points are predicted by the proxy for the construct with which the observed variables are associated, this is called cross validated communality. It is said to demonstrate that the observed variables are indeed represented in the proxy. The latter one is obtained by predicting the

questionable blocks using the latent variables used for prediction. If the construct is a dependent variable in a model, then the obscured data points may also be predicted by the proxies for the predictor constructs. This is labeled cross validated redundancy and is taken to show that the predictors effectively predict not only the dependent proxy but also the observed variables that make up the dependent proxy. As Wong (2013) recommended, Q^2 values of 0.02, 0.15 and 0.35 indicate an exogenous construct has a small, medium and large predictive relevance for an endogenous latent variable respectively.

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