

## **CONSUMER ACCEPTANCE OF MORE-THAN-VOICE (MTV) SERVICES: EVIDENCE FROM THE BOTTOM OF PYRAMID IN BANGLADESH**

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### **ABSTRACT**

More-than-voice (MTV) services are becoming widespread in the developing countries among individuals who represent the bottom-of-pyramid (BoP). The BoP comprises individuals whose income is less than \$2 per day. Despite the widespread use of MTV services among the consumers at the BoP, there is no study on what affects their adoption of these services. Therefore, this study investigates the factors that influence consumer acceptance of MTV services at the BoP. The research model proposes that perceived usefulness, perceived ease of use, perceived social influence, perceived acumen to use, perceived value and perceived facilitating conditions are the principal factors influencing the consumer acceptance of MTV services at the BoP. Secondary data collected by Teleuse@BOP4 from Bangladesh were used to validate the proposed model. Multiple regression analysis was conducted to test the hypotheses. The results indicate that the acceptance of MTV services at the BoP is positively influenced by perceived usefulness, perceived ease of use, perceived acumen to use, perceived facilitating conditions and perceived value. The results also indicate that perceived social influence has no significant influence on the acceptance of MTV services by consumers in the BoP.

**JEL Classification:** O1, O2, O3

**Keywords:** More-than-voice; MTV; MTV services; Bottom of Pyramid; Technology Adoption; Consumer Acceptance

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### **INTRODUCTION**

The use of mobile phones is no longer limited to voice calls (i.e., making and receiving calls) only. The advancement of information and telecommunication technology (ICT) and the integration of multitude of features into mobile phones have made it possible to utilize mobile phones in services that span beyond voice calls. For example, mobile phones may be used in services that include messaging, mobile banking, bill payments, updates on social media, watching television, playing games, listening to music, browsing the Web, etc. More-than-voice (MTV) services refer to direct or indirect usage of mobile phones in services other than voice calls. These services have gained strong foothold in both developed and developing countries. The amount of data in MTV services surpassed the amount of data in voice calls in the United States for the first time in 2009 (Wortham, 2010). M-Pesa, mobile money transfer in Africa, and IMPS (Inter-Bank Mobile Payment

Service) in India have revolutionized banking beyond the traditional brick-and-mortar banking concept (Govindarajan, 2012). Developing countries are ahead of developed countries in certain MTV services such as mobile banking. MTV services are expected to gain even stronger foothold especially in the developing countries due to the surge in numbers of mobile broadband subscriptions (BBCNT, 2012).

Two-thirds of the world's mobile phone users were from the developing countries by late 2008 (Zuckerman, 2010). This number reached 77 percent in 2010 (Mlot, 2012). With over 6 billion mobile phone subscribers worldwide (The World Factbook, 2012), developing nations constitute a significant market for both cellular telecommunication and MTV services. The philosophy of "mobile first" to build and educate the nation, the developing world possesses the viability for effective use of certain MTV services. For example, with the support of BBC World Service, an MTV service is used to promote spoken English among Bangladeshis. MTV services are, in fact, very commonplace in developing countries. In Kenya, Mexico and Indonesia, text messages are used by 80 to 95 percent of the population (Mlot, 2012). Cellular service providers in Bangladesh utilize mobile advertising to promote their service plans and promotions. Mobile banking is an integral part of daily life in Africa. Such examples are omnipresent throughout the developing world.

Despite the widespread use and increasing growth of MTV services, there is a paucity of research on the adoption of these services by consumers in both developed and developing countries. In particular, there has been no research pertaining to consumer acceptance of MTV services by consumers at the bottom of the pyramid (BoP) in developing countries. The BoP represents a socio-economic group of people who live on less than 2 dollar per day (Prahalad and Hart, 2006). People at the BoP comprise the majority of consumers of phone phones in developing countries. Islam and Gronlund (2011) found that income was not a predictor of ownership and use of mobile phone, and that even very poor people chose to have a mobile phone. Thus, MTV services have a tremendous potential for growth in developing countries. Therefore, an understanding of what factors influence the acceptance of MTV services by BoP consumers will not only add to the literature on ICT but also help MTV service providers make strategic decisions with regard to implementation of these services. The objective of this study is to explore the factors affecting BoP consumers' intention to use MTV services by presenting evidence Bangladesh. The rest of the paper is organized as follows: a brief discussion of the theoretical foundation is presented followed by expositions of research hypotheses, methodology for the study, findings and analysis, and discussion on the major findings and their implications. The paper ends with a section on limitations and future direction of the study.

## **THEORETICAL BACKGROUND**

This study draws from the literature on ICT and information technology (IT). While ICT refers to technologies that provide access to information through telecommunications, IT embodies anything related to computing technologies such as networking, hardware, software, the Internet, or people associated with them (techterms.com). ICT is IT with primary focus on communication technologies that may include the Internet, wireless networks, mobile phones and other communication mediums. MTV services involve a

blend of ICT and IT technologies in that they are consumed using wireless telecommunications and cellular phone technologies.

A review of ICT literature helps understand the role of demographic variables in the use of mobile phones within the telecommunication infrastructure. The extant ICT literature suggests that such demographic variables as income and education positively affect the use of computer and Internet but have no significant influence on the use of mobile phones in developing countries (Rad, Kurt and Polatöz, 2013; Balamoune-Lutz, 2003). However, studies have found a significant impact of usefulness, ease of use, price value, social influence and facilitating conditions on the usage of ICT services (Gupta, Dasgupta and Gupta, 2008; de Silva and Ratnadiwakara, 2008; Islam and Gronlund, 2010; Kazi and Mannan, 2013). Social influence and facilitating conditions were found to have a positive impact on the use of ICT in India (Gupta, Dasgupta and Gupta, 2008). Since ICT reduces transaction costs by enabling timely and affordable communication, price value is considered to be a very important predictor of ICT services (de Silva and Ratnadiwakara, 2008). Islam and Gronlund (2010) found social influence, perceived usefulness and perceived ease of use to be significant predictors of intention to use a mobile-based market information system in Bangladesh. Consumer acceptance of mobile banking services was significantly influenced by social influence, perceived risk, perceived usefulness, and perceived ease of use (Kazi and Mannan, 2013). Since MTV services are a type of ICT services, the factors affecting the adoption of the latter will also affect that of the former.

Constructs such as usefulness, ease of use, price value, social influence and facilitating conditions have been adapted to ICT literature from IT literature. More specifically, these constructs have come from two widely used technology acceptance models: the technology acceptance model (TAM), and the unified theory of acceptance and use of technology (UTAUT). Thus, TAM and UTAUT provide the theoretical foundation for this study. TAM and UTAUT can be applied across technologies, people, settings and times, and both can be used to explain technology acceptance (Kuo, Liu and Ma, 2013). TAM has been used to examine the adoption of RFID technology (Hossain and Prybutok, 2008), mobile chat (Nysveen, Pedersen and Thorbjørnsen, 2005), use of e-commerce (Zhang, Prybutok and Strutton, 2007), users' purchasing behavior in e-commerce (Zhang, Prybutok and Koh, 2006), mobile commerce (Cyr, Head and Ivanov, 2006), mobile-commerce adoption (Pedersen, Methlie and Thorbjørnsen, 2002). The UTAUT model is not as widely used as TAM but has gradually drawn researchers' attention in the vast IT field. It has been recently applied to exploring user acceptance of mobile technologies (Zhou, Lu and Wang, 2010). It has been used to examine online social support in using instant messaging (Lin and Anol, 2008), social media in public relations (Curtis, Edwards, Fraser, Gudelsky, Holmquist, Thornton, Sweetser, 2010), frequency of computer use, and differences in information and communication technology skills (Verhoeven, Heerwegh & De Wit 2010), and in the use of ICT in developing countries (Gupta, Dasgupta and Gupta, 2008). UTAUT has also been used to provide insight into cross-cultural technology acceptance differences (Oshlyansky, Cairns and Thimbleby, 2007), in mobile commerce acceptance (Koivumäki, Ristola and Kesti, 2008; Min, Ji and Qu, 2008), international comparison of internet banking (Im, Hong and Kang, 2011), mobile banking acceptance (Zhou, Lu and Wang, 2010), and short messaging system (Carlsson, Carlsson, Hyvonen, Puhakainen and Walden, 2006).

Various studies have utilized both TAM and UTAUT models together (Al-Qeisis, 2009; Algharibi and Arvanitis, 2011; Anderson and Schwager, 2004; Alwahaishi and Snášel, 2013). Using TAM alone, it is not possible to predict the influence of volitional, situational and social conditions. The influence of significant others, perceived ability and control are not present in TAM, but may influence IT usage (Abbasi, Chandio, Soomro and Shah, 2011; Taylor and Todd, 1995). In addition, TAM can only explain about 40% of system use and some literature suggests that significant factors such as human and social change processes are not included in TAM (Legris, Ingham and Collette, 2003). In order to overcome these limitations, this study proposed a model that incorporates necessary constructs from TAM and UTAUT to predict the acceptance of MTV services by BoP consumers in developing countries.

## RESEARCH MODEL AND HYPOTHESES

Consistent with the theoretical background, this study proposes and validates the model presented in Figure 1. As Figure 1 portrays, consumer acceptance of MTV services is a function of perceived usefulness, perceived ease of use, social influence, perceived value, perceived acumen to use and facilitating conditions. That is,

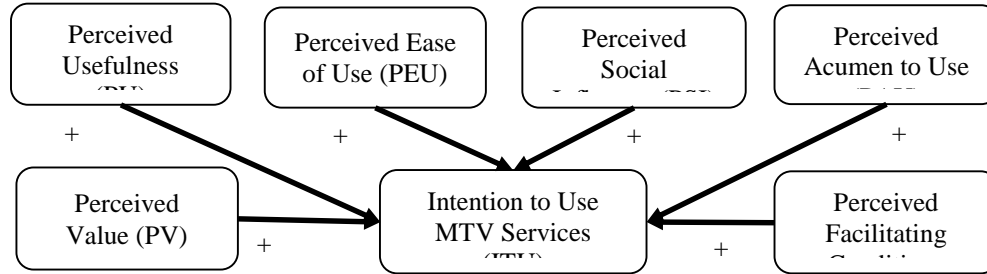
$$ITU = f(PU, PEU, PSI, PAU, PV, PFC)$$

Where: PU = Perceived usefulness  
 PEU = Perceived ease of use  
 PSI = Perceived social influence  
 PAU = Perceived acumen to use  
 PV = Perceived value  
 PFC = Perceived facilitating conditions  
 and, ITU = Intention to use MTV services

Brief definitions of the model constructs are presented below:

- Intention to use: The extent to which the user would reuse MTV services in future.
- Perceived usefulness: The extent to which the users believe that using MTV services would fulfill a purpose.
- Perceived ease of use: The extent to which the users believe that using MTV services is effortless.
- Perceived social influence: The extent to which the users perceive that their peers use and approve their MTV usage.
- Perceived acumen to use: The extent to which the users believe that they have the necessary knowledge to use MTV services.
- Perceived value: The extent to which the users perceive that the use of MTV services is worth the price paid.
- Facilitating conditions: The extent to which the users believe that they have the resources necessary to use MTV services.

**FIGURE 1. RESEARCH MODEL FOR CONSUMER ACCEPTANCE OF MTV SERVICES AT THE BOP**



The proposed research model has one dependent variable and six independent variables. The models – TAM and UTAUT – that underlie this model posit that the independent measures have a positive influence on the dependent measure. Based on the theoretical underpinnings, we propose the following hypotheses:

- H1: There is a positive relationship between perceived usefulness of MTV services and the intention to use MTV services.
- H2: There is a positive relationship between perceived ease of use of MTV services and the intention to use MTV services.
- H3: There is a positive relationship between perceived social influence for MTV services and the intention to use MTV services.
- H4: There is a positive relationship between perceived acumen to use MTV services and the intention to use MTV services.
- H5: There is a positive relationship between perceived value of MTV services and the intention to use MTV services.
- H6: There is a positive relationship between perceived facilitating conditions for MTV services and the intention to use MTV services.

## **METHODOLOGY**

This study used secondary data to test the proposed hypotheses. The data were drawn from LIRNEasia's ([www.lirneasia.net](http://www.lirneasia.net)) Teleuse@BOP4 study. The Teleuse@BOP study was carried out with the aid of a grant from the International Development Research Centre (IDRC), Ottawa, Canada ([www.idrc.ca](http://www.idrc.ca)) and UKaid from the Department for International Development, UK ([www.dfid.uk](http://www.dfid.uk)). Using data from Teleuse@BOP has not only saved time and money, but also provided greater reliability. A significant number of researchers (Agüero, Silva and Kang, 2011; Lokanathan and Nilusha, 2012; Zainudeen and Ratnadiwakara, 2011; Zainudeen, Samarajiva and Sivapragasam, 2011) have used the

dataset from the Teleuse@BOP4 study due to its well-accepted reliability and validity. Teleuse@BOP4 study was conducted in India, Pakistan, Bangladesh, Sri Lanka, Thailand, and most recently, Java (Indonesia), focusing on the use of mobile phones for productive purposes. The study conducted a face-to-face survey on the use of mobile phones among consumers that represent the BoP. In Bangladesh, the Teleuse@BOP study conducted 582 complete surveys on the adoption of MTV services by the BoP consumers.

## ANALYSES AND RESULTS

The data were initially factor analyzed to identify the relevant factors affecting BoP's intention to use MTV services. The factor analysis for independent measures extracted six factors that correspond to constructs such as perceived usefulness, perceived ease of use, perceived social influence, perceived acumen to use, perceived value and perceived facilitating condition. The results of the factor analysis for independent measures are shown in Table 1. A separate factor analysis was conducted for the dependent measure. The results of this factor analysis are presented in Table 2. Table 2 shows that the factor analysis resulted in one factor for the dependent variable.

**TABLE 1. SCALE ITEMS – INDEPENDENT VARIABLES**

	PU	PEU	PSI	PAU	PV	PFC
<b><i>Perceived usefulness (PU)</i></b>						
PU2: Using ___ increases my chances of achieving things that are important to me	0.821					
PU1: I find ___ to be useful in my life	0.817					
PU3: Using ___ helps me accomplish things more quickly	0.763					
<b><i>Perceived ease of use (PEU)</i></b>						
PEU2: I think learning how to use ___ is easy to me		0.818				
PEU3: My interaction with ___ is clear and understandable		0.809				
PEU1: I find ___ to be easy to use		0.737				
<b><i>Perceived social influence (PSI)</i></b>						
PSI3: I use ___ because I want to use the same service people around me use			0.835			

PSI4: I use ___ because it is common to use it in my community						0.789
PSI2: People who influence my behaviors think I should use ___.						0.558
<b><i>Perceived acumen to use (PAU)</i></b>						
PAU1: I have the knowledge and ability necessary to use ___.						0.862
PAU2: Using ___ is entirely within my control						0.771
<b><i>Perceived value (PV)</i></b>						
PV1: I think ___ is reasonably priced						0.862
PV2: I think ___ offers values for money						0.812
<b><i>Perceived facilitating condition (PFC)</i></b>						
PFC1: When I have problems in using ___. I can get help from my friends/family members						0.879
PFC2: When I have problems in using ___. I can get help from the service providers or experts						0.814
Percentage of variance (total = 71.57%)	14.640	14.411	11.582	10.408	10.331	10.198
Mean	4.073	4.102	3.652	3.983	3.485	3.665
Std deviation	0.736	0.717	0.936	0.789	1.043	1.582
Cronbach's alpha	0.780	0.760	0.664	0.685	0.697	0.654

*Note: Scale anchor: 1 = strongly disagree; 5 = strongly agree*

**TABLE 2. SCALE ITEMS – DEPENDENT VARIABLE**

	<b>ITU</b>
<i>Intention to use MTV</i>	
ITU3: I expect that I would use ___ frequently in future	0.835
ITU2: I intend to use ___ in future	0.822
ITU1: I like the idea of using ___.	0.788
Mean	4.101
Std. deviation	0.722
Cronbach's alpha	0.745

*Note: Scale anchor: 1 = strongly disagree; 5 = strongly agree*

The factors were tested for internal consistency (i.e., the reliability of the factors) using Cronbach's alpha. A Cronbach's alpha of 0.65 or higher (Nunnally, 1978) was used as an acceptable value for internal consistency of the measures. The Cronbach's alpha of the dependent variable (intention to use MTV) is 0.745. The Cronbach's alphas for independent variables range from 0.654 to 0.780. These values support the contention that all the factors had adequate reliability. The reliabilities of the factors are shown in Tables 1 and 2. We tested the convergent and discriminant validities of the factors by using the item-total correlations and the inter-factor correlations, respectively. Factors are deemed to have adequate convergent validity if all item-total correlations equal or exceed the recommended criterion of 0.40 (Jayanti and Burns, 1998). Table 3 shows that all item-total correlations are more than the recommended criterion of 0.40 except for PSI2. The item-total correlation for PSI2 is 0.39, which marginally falls short of 0.40. Since PSI2 plays a vital role in the factor's internal consistency, we decided to retain this item. Overall, the item-total correlation values support the contention that the scales have adequate levels of convergent validity. Factors are deemed to have adequate discriminant validity if the inter-factor correlations (using composite factor scores) are less than the reliability of each scale (Rajamma, Paswan and Hossain, 2009; Gaski and Nevin, 1985). As Table 4 indicates, the inter-factor correlations were less than the Cronbach's alpha for each construct. This suggests that the scales have adequate levels of discriminant validity.



**TABLE 3. SCALE RELIABILITY AND CNVERGENT VALIDITY**

Scale Items	Corrected Item- Total Correlation	Cronbach 's Alpha
<b><i>Perceived usefulness (PU)</i></b>		<b>0.78</b>
PU1: I find ___ to be useful in my life	0.66	
PU2: Using ___ increases my chances of achieving things that are important to me	0.61	
PU3: Using ___ helps me accomplish things more quickly	0.59	
<b><i>Perceived ease of use (PEU)</i></b>		<b>0.76</b>
PEU1: I find ___ to be easy to use	0.61	
PEU2: I think learning how to use ___ is easy to me	0.67	
PEU3: My interaction with ___ is clear and understandable	0.61	
<b><i>Perceived social influence (PSI)</i></b>		<b>0.66</b>
PSI2: People who influence my behaviors think I should use ___.	0.39	
PSI3: I use ___ because I want to use the same service people around me use	0.53	
PSI4: I use ___ because it is common to use it in my community	0.46	
<b><i>Perceived acumen to use (PAU)</i></b>		<b>0.69</b>
PAU1: I have the knowledge and ability necessary to use ___.	0.52	
PAU2: Using ___ is entirely within my control	0.52	
<b><i>Perceived value (PV)</i></b>		<b>0.70</b>
PV1: I think ___ is reasonably priced	0.54	
PV2: I think ___ offers values for money	0.54	
<b><i>Perceived facilitating condition (PFC)</i></b>		<b>0.65</b>
PFC1: When I have problems in using ___. I can get help from my friends/family members	0.50	
PFC2: When I have problems in using ___. I can get help from the service providers or experts	0.50	

**TABLE 4. INTER-FACTOR CORRELATIONS**

	PU	PEU	PSI	PAU	PV	PFC
PU	<b>0.780</b>					
PEU	0.458	<b>0.760</b>				
PSI	0.348	0.346	<b>0.664</b>			
PAU	0.280	0.411	0.306	<b>0.685</b>		
PV	0.178	0.255	0.266	0.267	<b>0.697</b>	
PFC	0.137	0.039	0.119	0.124	0.265	<b>0.654</b>

*Note: The diagonal values are alpha scores.*

Multiple linear regression analysis was used to test the proposed hypotheses. The proposed research model in this study has one dependent variable and six independent variables. We used summated scores of the respective factors to obtain the scores for both dependent and independent measures. For regression analysis, *ITU* was used as dependent variable, and *PU*, *PEU*, *PSI*, *PAU*, *PV* and *PFC* as independent variables. The results of the regression analysis are shown in Table 5.

**TABLE 5. REGRESSION ANALYSIS PREDICTING INTENTION TO USE MTV TECHNOLOGY**

Predictor	Unstd. Beta Coeff.	Std. Beta Coeff.	t-Stat	p-Value	VI F	Hypothesis	Hypothesized Effect	Supported?
PU	0.285	0.291	7.621	0.000	1.357	H1	+	Yes
PEU	0.212	0.211	5.272	0.000	1.490	H2	+	Yes
PSI	0.083	0.108	2.938	0.003	1.268	H3	+	Yes
PAU	0.162	0.177	4.752	0.000	1.290	H4	+	Yes
PV	0.070	0.102	2.831	0.005	1.206	H5	+	Yes
PFC	0.000	-.001	-.029	0.977	1.098	H6	-	No
R	= 0.619							
R <sup>2</sup>	= 0.384							
Adjusted R <sup>2</sup>	= 0.377							

We conducted the runs test, Levene's test and Kolmogorov–Smirnov test to check for randomness, constancy of variance, and normality, respectively. These tests show that there is no evidence of violation of the assumptions underlying multiple regression analysis. Also, there is no evidence of multicollinearity because the VIFs and condition indexes are within acceptable levels (VIFs < 4.00 and condition indexes < 30.00).

The results of multiple regression analysis show that PU, PEU, PSI, PAU and PV are significant predictors of ITU. These findings support five hypotheses (H1, H2, H3, H4 and H5), indicating that perceived usefulness, perceived ease of use, perceived social influence, perceived acumen of use and perceived value of MTV services play significant role in predicting the intention to use MTV services. The results also show that PFC is an insignificant predictor of ITU, suggesting that perceived facilitating condition does not affect the intention to use MTV services in the presence of other independent variables.

## **DISCUSSION AND IMPLICATIONS**

The objective of this study was to examine the factors that influence consumer acceptance of MTV services at the BoP in Bangladesh. The findings suggest that usefulness, ease of use, social influence, acumen to use and value have a significant influence on the intention to use MTV services. This is consistent with considerable research on information technology acceptance (e.g., Zhang and Mao, 2008; Davis, 1989; Venkatesh, Thong and Xu, 2012). However, contrary to the prior literature, facilitating conditions have been found to have insignificant influence on the intention to use MTV services. Perceived usefulness was found to have a significant positive influence on the BoP user's intention to use MTV services in Bangladesh. This implies that the higher the perceived usefulness of MTV services, the greater the consumer intention to use these services. The users think that the use of MTV services are really useful for their life and will enhance their job performance.

Perceived ease of use was another significant contributor to explaining BoP users' intention to MTV services. It has a positive effect on the intention to use the MTV services. This implies that the higher the perceived ease of use of MTV services, the greater the consumer intention to use these services. This result is in line with the research on the intention to use a technology. Perceived ease of use captures the cognitive effort that mobile phone users exert in dealing with MTV services. The less effort consumers believe they need to spend dealing with MTV services, the more likely they would be willing to use MTV services. As hypothesized, perceived social influence and perceived acumen to use were found to have a significant impact on BoP consumers' intention to use MTV services. Both social influence and acumen to use positively affect the intention to use MTV services. A consumer will have a positive attitude towards the use of MTV services if others in the society positively influence his behavior to do so. Similarly, a consumer will use MTV services if people around him in the community use it. Acumen to use MTV services has a significant impact on the adoption of MTV services. This finding indicates that the more capable and knowledgeable individuals are of using MTV services, the more likely they will be willing to use these services.

Also as hypothesized, perceived value was a significant predictor of the intention to use MTV services by the consumers at BoP in Bangladesh. Pricing and cost structure of MTV services has a positive effect on the use of these services. This implies that the more the benefits of using MTV services than the costs, the more willing consumers are to use

them. That is, consumers will use MTV services if the services are reasonably priced and perceived worthwhile by them.

Lastly, contrary to what was hypothesized, the findings suggest that perceived facilitating conditions do not have any significant effect on the intention to use MTV services. This implies that the fact that consumers can get help from their friends, family members and/or service providers when they encounter a problem will not influence their intention to use MTV services. This finding is contradictory to the notion that “an organizational and technical infrastructure exists to support use of the system” (Venkatesh, Brown, Maruping and Bala, 2008). However, the interpretation of the result of this study can be seen in two ways. First, there is really no significance of facilitating conditions over the intention to use MTV services due to the nature of people from the BOP level. Second, the limitations (Venkatesh, Brown, Maruping and Bala, 2008) of facilitating conditions imply the presence of incomplete information and/or uncertainty regarding a behavior (Ajzen, 1991). These limitations may occur when unforeseen events and impediments change the initial behavioral intention or when they may involve imagining possible future events (Venkatesh, Maruping and Brown, 2006).

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