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Identification of the Key Factors Affecting the Adoption of Mobile Phone Gaming: A Study in the Context of Bangladesh

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Abstract- In recent years the use of mobile phones and smart phones have become more widespread and continue to grow significantly and almost half of the population of the earth now use mobile communications. The mobile telecommunications industry is a key driver of both economic and social development across the globe and it is one of the most transformational industries in the world today, enriching the daily lives of almost half of the world's population and mobile device is becoming part and parcel in our daily life and plays a pivotal role in passing time and recreation device for people specially young generation. This study investigates the identification of the key factors affecting the adoption of mobile phone gaming in the context of Bangladesh. The nature of the research is conclusive in form of descriptive with the help of collecting primary data via personal face to face interview where non probability convenience sampling were used and primary data were analyzed by descriptive statistics, correlation, ANOVA, multiple regression, factor analysis (principal component analysis). The result of the study shows that all the variables are correlated with and they have significant influence on the adoption of mobile phone gaming. The main findings of the study reveals that first three factors easiness, usefulness, enjoyment are most influencing factors for mobile phone gaming adoption and subsequent factors are attitude, intention, behavior, and concentration. The contribution made by the study is give suggestions for the operators of mobile phone to consider the above mentioned factors while designing their market offerings for customers to get the maximum benefit by satisfying mobile phone gaming users in Bangladesh. Marketers should, however, carefully consider the key factors that influence the adoption and performance the operations of mobile phone gaming.

Keywords: mobile phone gaming, adoption, usefulness, personal attitude, concentration, telecommunication, 3G, smart phones.

I. INTRODUCTION

Little research has been carried out in the area of mobile phone industry in the context of Bangladesh. Although some researchers have paid attention in the area, it is an endeavor to investigate

the factors that influence the adoption of mobile phone gaming. Recent years the use of mobile phones and smart phones has become more widespread and continues to grow significantly. The rapid growth of third generation (3G) mobile technology has radically changed the lifestyle of the young generations. 3G mobile technology incorporates voice data and Internet access, making smart phones similar to personal computers. The mobile telecommunications industry is a key driver of both economic and social development across the globe. It advances technology, enables new business models that could not have existed without it and improves the efficiency of existing ones, creating jobs in the process and providing an important source of funding for governments. It extends the reach of healthcare, education and finance in developing countries. In doing so, it connects us all more closely, allows us greater access to information and the world around us and empowers the vulnerable. The mobile industry is one of the most transformational industries in the world today, enriching the daily lives of almost half the world's population. Almost half the population of the earth now uses mobile communications. There are still many adults and young people who would appreciate the social and economic benefits of mobile technology but are unable to access it, highlighting a huge opportunities for future growth and a challenge to all players in the industry ecosystem to expand the scope of products and services to tap this demand. It is obvious that the next few years will see continued growth with a further 700 million subscribers expected to be added by 2017 and the 4 billion mark to be passed in 2018. This growth is mirrored by strong mobile connections growth, to almost 7 billion connections in 2012, as many consumers have multiple devices or use multiple SIMs to access the best tariffs, while firms in many industry sectors roll out M2M applications to boost their own productivity and tap into new markets. Despite challenging economic headwinds in many regions, the market is expected to grow even more strongly on the dimension of connections over the next five years, with 3 billion additional connections expected to be added between 2012 and 2017, a growth rate of 7.6% p.a. Mark Page (2013) also suggested that 3.2 billion people of the 7 billion on earth benefit from having a mobile phone. A further 700 million subscribers

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are expected by 2017, but this still leaves a huge potential for further growth and the headline growth in number of connections hides an important shift taking place in the types of connections that make up the total. In terms of numbers of connections, 2G technology – which provides digital quality voice, messaging and low bandwidth data connections – still accounts for the majority of global connections in 2012, 5 billion of the 6.8 billion totals. However, the growth in connections will be driven by increased uptake of 3G and 4G connections, which are forecast to increase from 26% to 53% of global connections over the period 2012 to 2017. In Bangladesh, there is a growing number of wireless technology users in the area of M-commerce. There are more consumers who have a mobile phone than those who have a personal computer. Despite the rapidly growing number of mobile phone users in Bangladesh, M-commerce is a relatively new phenomenon in Bangladesh compared to other markets in Europe, the U.S., and the Asia Pacific. Currently, there are six mobile phone operators offering their services to customers in Bangladesh. GrameenPhone (GP) owned by Telenor (62%) and Grameen Telecom (38%) is the largest and the fastest growing cellular service provider in Bangladesh. BanglaLink is the second largest cellular service provider. It is a wholly owned subsidiary of Orascom Telecom. Robi is the 3rd largest cellular service provider in Bangladesh. It is a joint venture between Telecom Malaysia Sdn Bhd of Malaysia (70%) and a local company A.K. Khan & Company (30%). The fourth largest cellular service provider in Bangladesh is Warid Telecom International Ltd. Warid Telecom is a wholly owned subsidiary of Warid Telecom International LLC. Abu Dhabi. The other two mobile phone operators in Bangladesh are Citycell and Teletalk Bangladesh Ltd. Before moving on, a clear understanding of what mobile gaming actually is needs to be established. Liang and Yeh (2011, p. 188) define mobile game as a video game played on mobile devices, including mobile phones, smart phones, PDA's or handheld computers. However, as handheld gaming has existed for such a long time in the form of Game boys, Tetris and other small devices, the phenomenon is not very new anymore. Thus, the mobile gaming is understood as the form of gaming introduced by the new smart phone categories. Following this interpretation, mobile games are purchased or downloaded from online digital application stores, without ever taking any physical forms in the distribution channel. Liu and Li (2011) showed that use context and cognitive concentration which is essentially the same as flow are significant factors of mobile gaming adoption in the version of TAM they used. Liu from China focused on the adoption progress and performance at a minimum cost. The results of mobile learning in solving puzzles. These studies showed a significant improvement in terms of learning concentrated on the use of SMS and MMS in the

learning outcomes and satisfaction compared to the traditional environment. However, the researcher ignored the important factors, such as affordability and pedagogy. As to more recent studies with an oriental focus, especially on mobile industry, we can mention Lu et al. (2007), who studied whether a TAM-based model is applicable in the Chinese context. Originally introduced by Fred Davis as early as in the 1980s, the technology acceptance model sought to measure the willingness of people to accept and adopt new information technology innovations of that era, such as the electronic mail systems (Davis 1989). As to more recent studies with an oriental focus, especially on mobile industry. According to Volery and Lord, student adoption of university has introduced mobile learning by sending technology is based on the satisfaction derived from messages through SMS. Using the device, flexibility, self-confidence, self-efficacy and participation. Ismail et al. (2009) conducted learning in the United States; these factors proved to be action research on the adoption of SMS among long distance education students in University Sains Malaysia. The learning characteristics and design were examined based on communication, convenience, enjoyment, satisfaction, quality, pace and reliability. Mariga (2003) posits that perceived usefulness, perceived ease of use, trust, and enjoyment is the significant determinant for the adoption of M-commerce services. Huei (2004) suggests that perceived usefulness, perceived ease of use, perceived risk, and cost is the influencing factors for the adoption of M-commerce. Economic and infrastructure issues can influence the rate of m-commerce adoption (Fraunholz & Unnithan, 2004). Cultural differences can potentially play a significant role in m-commerce adoption (Hards et al., 2005). The main obstacle toward personalization is privacy and security, which can negatively impact the prevalent use of such applications. So far, there has not been an approach focusing specifically on the wireless/mobile user (Panayiotou & Samaras, 2004). Brunner and Kumar (2005) suggest that perceived enjoyment may help explain consumer acceptance of handheld Internet devices better than the original TAM constructs alone. Perceived enjoyment, usefulness, and expressiveness influence the intention to use mobile services (Nysveen et al., 2005). Lu, Yu, Liu and Yao (2003) observe that complexity, facilitating conditions, social influences, and trust factors influence user acceptance of Internet via mobile devices. Luarn and Lin (2005) also extend TAM by adding trust, self-efficacy, and transaction cost as determinants of usage intention. Furthermore, systems quality and social influence also contribute to the adoption of mobile services (Kleijnen & Wetzels, 2004). Lee and Benbasat (2003) recommend the multi-tasking nature of device usage as well as users' limited attention as two of the many essential factors affecting m-commerce adoption. Other technical factors that can

impact m-commerce adoption include user interface limitations, slow network connections, information security, or even the threat of government regulations (Wen & Mahatanankoon, 2004). Sarker and Wells (2003) find that users' positive experience with mobile usage (i.e., functional, psychological, and relational outcomes) influence adoption decisions and behaviors. They suggest that cultural origin influences individuals' patterns of mobile technology usage. Bouwman et al. (2007) further suggest the importance of physical, cognitive, security, and economic factors when delivering bundled mobile services to consumers. Apart from the social uses outlined, earlier studies by Leung and Wei (2000) indicate that utilitarian uses of the mobile phone are more frequent and instrumental motives are much stronger than social uses. Various types of business deals including cross country transactions are being conducted on mobile phones daily. The two fundamental attributes of the mobile phone which has lead to its flourished usage are mobility and immediate access. However, it is this characteristic which has extended its usage from a traditional voice communication to other value added services like games, internet, banking, payments and informational services, perceived ease of use, (PEOU) is the degree to which a person believes that using a particular system will be free of effort. Perceived ease of use and perceived usefulness are two key components that have made the technology acceptance model one of the most influential research models related to understanding information technology usage. PU in the adoption of mobile services is defined in a broader context to include how well consumers believes mobile services can be integrated into their daily activities. Various researchers have shown that perceived usefulness can also relate to the increased performance of a non-job related task that occurs outside of an organizational. Tseng, Hsu and Chuang (2012) found that PEOU and PU made a significant positive impact on attitudes towards website use. PEOU and PU have a positive impact on consumer online shopping; future plans to use online shopping (Koufaris, 2002), Enjoyment Studies have found that user entertainment plays a significant role in the success of certain technology. Research has shown that the adoption and satisfaction levels of information systems and products are associated with user perceptions of entertainment provided by the technology (Kim et al., 2009). The most popular reason for the adoption of e-books by university students was for enjoyment (reading pleasure and leisure) over academic purposes. Similarly, enjoyment has been shown to be a key to player usage of online gaming. Involvement user involvement has been shown to be a key determinant of technology usage. Research by Swanson (1974) indicated that high user involvement ultimately increases frequency of use. The core research problem to be addressed in this study is whether the

factors considered by literature review actually influence the adoption of mobile phone gaming among users in Bangladesh. The specific research objective is to investigate and identify the key factors and most influencing factors that users consider when they adopt the mobile phone gaming in the context of Bangladesh.

II. METHODOLOGY

a) Objectives of the study

The objective of the study was to identify the various key factors that affect the adoption of mobile phone gaming. More specifically, the study aimed to achieve the following specific research objectives:

- To determine whether the key factors are correlated with each other.
- To determine whether the factors are appropriate for conducting the statistical analysis.
- To determine whether easiness, usefulness, and enjoyment are the most influencing factors leading to subsequent factors that influence the mobile phone gaming adoption.

b) Research Question

Do the key factors affecting the adoption of mobile phone gaming?

c) Hypothesis of the study

H_0 : Key factors do not affect the adoption of mobile phone gaming.

H_1 : Key factors affect the adoption of mobile phone gaming.

III. DISCUSSION AND ANALYSIS

a) Factor analysis Model

An econometric model is developed for the study in order to testify the relationship between the dependent and independent variables and to test the hypotheses relevant for the study. This is an integrated model, which is proposed on the basis of the Mobile phone gaming adoption. Mobile phone gaming adoption as a function of mobile adoption can be depicted in the form of the following equation.

Table 1 : A brief of the methodology of the study

Research type/Design	Conclusive research in form of descriptive.
Research Instrument	Survey questionnaire.
Data Source	Primary data for statistical analysis and secondary data for literature review and the sources are Internet, journals, books, magazines etc.
Data collection mode	Survey in the form of Personal face to face interview.
Measurement Technique/Basic scale design	Non comparative scaling techniques. Itemized Ranking scale in the form of 5 point likert scale. (1= Fully Disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Fully Agree)
Sample Size	The target sample size 110 and realized sample size is 102 and the response rate is $102 \times 100 / 110 = 92\%$.
Sampling Technique	Non probability and its specific form like convenience sampling.
Sample Location	Rangpur division specially Dinajpur and Rangpur district of Bangladesh.
Time	June-Nov, 2014.
Reliability and Validity test	Cronbach's Alpha for internal consistency reliability, KMO Bartlett's Test of Sphericity for sample data adequacy for factor analysis.
Data analysis tools	Descriptive statistics, correlation, One way ANOVA, multiple regression, factor analysis (principal component analysis).

Conceptual framework of the study

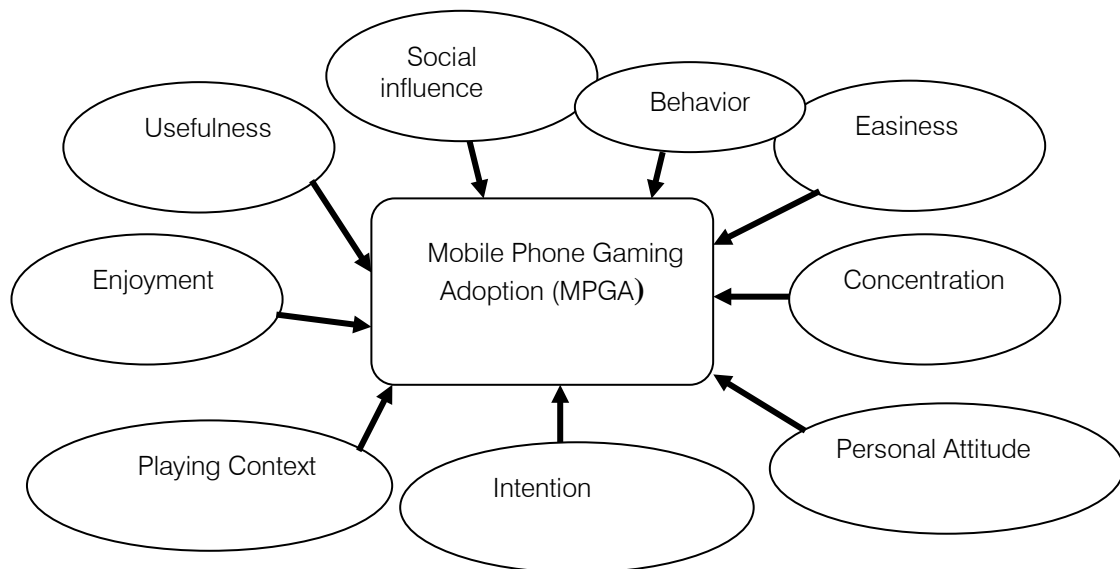


Figure 01: Proposed MPGA Model

$$Y(\text{MPGA}) = \alpha_0 + \beta_1(\text{Ea}) + \beta_2(\text{Us}) + \beta_3(\text{En}) + \beta_4(\text{SI}) + \beta_5(\text{Co}) + \beta_6(\text{PC}) + \beta_7(\text{PA}) + \beta_8(\text{In}) + \beta_9(\text{Be}) + \varepsilon$$

$$Y(\text{MPG}) = 1.985 + 0.255(\text{Ea}) + 0.012(\text{Us}) - 0.001(\text{En}) - 0.233(\text{SI}) + 0.284(\text{Co}) + 0.049(\text{PC}) + 0.056(\text{PA}) + 0.050(\text{In}) - 0.084(\text{Be}) + \varepsilon$$

where: α_0 -intercept, Ea- Easiness, Us- Usefulness, En- Enjoyment, SI- Social Influence, Co- Concentration, PC- Playing Context, PA – Personal Attitude, In- Intention, B- Behavior and ε -coefficient of error term

Table 2: Demographic profiles of the respondents

Variable	Frequency	%
Age(Years)		
10-20	10	9.8
20-30	83	81.4
30-40	2	2.0
40- above	7	6.9
Total	102	100.0
Gender		
Male	81	79.4
Female	21	20.6
Total	102	100.0
Profession		
Student	87	85.3
Teacher	4	3.9
Employee	7	6.9
Other	4	3.9
Total	102	100.0
User Category		
Expert	77	75.5
Novice	23	22.5
Total	102	100.0
Education		
Below SSC	5	4.9
SSC	4	3.9
HSC	1	1.0
Bachelor	79	77.5
Masters& Above	13	12.7
Total	102	100.0

b) Demographic Profile of the Respondents

Table 2 shows that out of total samples about 80% are male and 20% are female. 10% are below 20 years, 81% are 20 to 30 years 2% are 30-40 years and only 7 % are more than 40 years old. Most of mobile phone games users are students (85%), either employees or businessmen (7%), 4% are engaged in teaching. Educational status of the respondents shows that most of graduates and post graduate person play mobile phone gaming (78% and 12% respectively). This data indicates that higher educated people who have

completed or about to be completed play mobile phone game. Data also shows that (75%) users are expert and 25% are new users in playing mobile phone game.

c) Reliability Analysis, Means and Standard Deviations of the Study Variables

All items used a 5 (Five) points Likert scale as (1= Fully Disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Fully Agree. The Cronbach's alpha reliability test has been used to identify the validity of items used in survey. According to Hendrickson et al (1993) and McGraw and Wong (1996) the alpha of a scale should be greater than 0.70 for items to be used together as a scale. Finalize the item validity. As per shown in table 3 that all dimensions have appropriate reliability. Therefore minimum 0.700 coefficient alpha values accepted for the reliability of the variable used, all were found to show satisfactory Cronbach's value of between 0.668 and 0.762 (refer Table 3). Thus, all the Variables are considered reliable. In addition, the mean value for each of the ten components of Mobile phone gaming varied from 2.5833 to 3.6971. The standard deviation for these components ranges from 0.74627 to 1.16696. Mobile adoption had a mean value of 3.71 with a standard deviation of 1.10 whereas easiness had a mean of 3.70 and standard deviation of 0.75.

d) Multiple Regression Analysis

The first table of interest is the Model Summary table. This table provides the R, R², adjusted R², and the standard error of the estimate, which can be used to determine how well a regression model fits the data.

The R column represents the value of R, the multiple correlation coefficients. R can be considered to be one measure of the quality of the prediction of the dependent variable; in this case mobile game adoption. A value of 0.410 indicates a good level of prediction. The R Square column represents the R² value (also called the coefficient of determination), which is the proportion of variance in the dependent variable that can be explained by the independent variables. Technically, it is the proportion of variation accounted for by the regression model above and beyond the mean model. It is observed from table 4 that the value of R² is 0.176 that our independent variables explain 17.60 % of the variability of our dependent variable.

Thus, the regression equation of this study is: $Y \text{ (MPG)} = 1.985 + 0.255(Ea) + 0.012 (Us) - 0.001(En) - 0.233(SI) + 0.284 (Co) + 0.049 (PC) + 0.056 (PA) + 0.050(In) - 0.084 (Be) + \epsilon$.

Table 3: Reliability Analysis, Means and Standard Deviations of the Study Variables

Variables	Number of items	Cronbach's Alpha	Mean	Std. Dev.
Social Influence	3	0.706	2.5892	0.85514
Concentration	3	0.707	3.5667	0.80325
Playing context	2	0.758	3.5343	0.97813
Personal attitude	2	0.668	3.1716	1.07283
Intention	1	0.686	3.0980	1.12144
Behavior	2	0.707	2.5833	1.16696
Adoption	1	0.762	3.7157	1.10245
Easiness	3	0.714	3.6971	0.74627
Usefulness	2	0.705	3.4461	0.96192
Enjoyment	2	0.675	3.2696	1.04992

The regression equation indicates that most of the independent variables and dependent variable (MPGA) mobile adoption are positively related. Moreover, in Table 6, the collinearity statistics reveal that the tolerances of all the independent variables are greater than 0.1 and that the Variance Inflation Factors (VIF) are all less than 10. The tolerance shows the amount of correlation between the predictor and all the other remaining predictors. Variance inflation factors reflect the degree to which the standard error of the predictor was increased due to the predictor's correlation with the other predictors in the model. As the tolerance value < 0.1 or the VIF value > 10 is an indication of collinearity, there is not collinearity in the model of this study as can be seen in the result shown

in Table 6. Unstandardized coefficients indicate how much the dependent variable varies with an independent variable, when all other independent variables are held constant.

The F-ratio in the ANOVA table 5 tests whether the overall regression model is a good fit for the data. The table shows that the independent variables statistically significantly predict the dependent variable. As $F(9, 92) = 2.820$, $p < .05$, this model is significant. In addition, Table 5 is the result of ANOVA, which shows the value of $F(9, 92) = 2.820$ and it is significant at p value $0.006 < 0.05$. As a result, overall, the regression model is deemed to accurately predict mobile adoption towards mobile phone gaming.

Table 4: Model Summary

Model	R	R Square	Adjusted Square	R Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.419a	.176	.095	1.04882	.176	2.177	9	92	.031

a. Predictors: (Constant), Adoption, Usefulness, Playing Context, Intention, Easiness, Concentration, Enjoyment, Social Influence, Behavior, Personal Attitude.

Dependent Variable: mobile game adoption

Table 5: Regression Analysis Result between Independent Variables and Dependent Variables

ANOVA ^b	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.541	9	2.949	2.820	.006 ^a
	Residual	96.214	92	1.046		
	Total	122.755	101			

a. Predictors: (Constant), Behavior, Playing Context, Usefulness, Easiness, Concentration, Enjoyment, Social Influence, Intention, Personal Attitude

Table 6: Summary of Regression Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.985	0.659		3.010	0.003		
Easy to use	0.255	0.110	0.228	2.317	0.023	0.883	1.133
Usefulness	0.012	0.097	0.013	0.125	0.901	0.841	1.189
Enjoyment	-0.001	0.087	-0.002	-0.016	0.987	0.804	1.243
Social Influence	-0.233	0.090	-0.279	-2.582	0.011	0.729	1.371
Concentration	0.284	0.102	0.277	2.789	0.006	0.863	1.159
Playing Context	0.049	0.080	0.059	0.611	0.543	0.926	1.080
Personal Attitude	0.056	0.119	0.063	0.476	0.635	0.481	2.080
Intention	0.050	0.127	0.051	0.396	0.693	0.513	1.948
Behavior	-0.084	0.097	0.104	-0.863	0.390	0.591	1.692

a. Dependent Variable: mobile game adoption

Table 7: Correlation Matrix

		Ea	Us	En	SI	Co	PC	PA	In	Be
Correlation	Ea	1.000	.290	.213	.182	.280	.005	.272	.322	.178
	Us	.290	1.000	.328	.434	.313	.020	.342	.225	.200
	En	.213	.328	1.000	.377	.405	.237	.583	.364	.303
	SI	.182	.434	.377	1.000	.308	-.131	.454	.246	.442
	Co	.280	.313	.405	.308	1.000	.141	.222	.151	.111
	PC	.005	.020	.237	-.131	.141	1.000	.056	.010	-.096
	PA	.272	.342	.583	.454	.222	.056	1.000	.554	.435
	In	.322	.225	.364	.246	.151	.010	.554	1.000	.565
	Be	.178	.200	.303	.442	.111	-.096	.435	.565	1.000
	Sig. (1-tailed)	Ea		.002	.016	.034	.002	.481	.003	.000
Us		.002		.000	.000	.001	.419	.000	.011	.022
En		.016	.000		.000	.000	.008	.000	.000	.001
SI		.034	.000	.000		.001	.095	.000	.006	.000
Co		.002	.001	.000	.001		.079	.013	.065	.133
PC		.481	.419	.008	.095	.079		.289	.459	.169
PA		.003	.000	.000	.000	.013	.289		.000	.000
In		.000	.011	.000	.006	.065	.459	.000		.000
Be		.037	.022	.001	.000	.133	.169	.000	.000	

a. Determinant = .086

e) Analysis of correlation matrix

Correlation matrix is used to check the pattern of relationships among variables. It is seen that the majority of the values are greater than 0.05. so the relationships are correlated among variables. The value

of the determinants of the correlation matrix is .086 which is greater than the necessary value of 0.00001. Therefore multi colinearity is not a problem for these data. To sum up, all questions in the survey are correlate fairly well and none of the correlation

coefficients are particularly large . So there is no need to consider eliminating any questions at the research.

f) *KMO and Bartlett's Test*

The table 8 shows that the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity. The KMO statistic varies between 0 and 1. A value of 0 indicates that the sum of partial correlation is large relative to the sum of correlations. Hence factor analysis is likely to be inappropriate. A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis yields distinct and reliable results. Kaiser (1974) recommends accepting values greater than 0.5. Furthermore values between 0.7 and 0.8 are good. So our Kaiser-Meyer-Olkin Measure of Sampling Adequacy test is 0.752 or 75% is reliable and acceptable for further computation. So it is clear that factor analysis is appropriate for these data. Significance value also acceptable. Bartlett's Test of

Sphericity tests the null hypothesis that the original correlation matrix is an identity matrix. For factor analysis we need some relationships between variables and if the R matrix were an identity matrix then all correlation coefficients would be zero. We see a significant value less than 0.05. A significant test tells that R matrix is not an identity matrix that means there are some relationships between variables. For these data Bartlett's test is highly significant ($p < 0.05$), and therefore factor analysis is appropriate for this study.

Table 8: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.752
Bartlett's Test of Sphericity	Approx. Chi-Square 238.008
	df 36
	Sig. 0.000

Table 9: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
	3.332	37.023	37.023	3.332	37.023	37.023	2.328	25.867	25.867
	1.289	14.326	51.349	1.289	14.326	51.349	2.124	23.595	49.461
	1.065	11.828	63.178	1.065	11.828	63.178	1.234	13.716	63.178
	0.899	9.986	73.164						
	0.671	7.453	80.617						
	0.585	6.500	87.118						
	0.499	5.546	92.664						
	0.372	4.134	96.798						
	0.288	3.202	100.000						
Extraction Method: Principal Component Analysis.									

g) *Analysis of Total Variance Explained*

Principal Component Analysis: The correlation matrix of all 9 variables have been further subjected to principal component analysis. The factor matrix is obtained in the principal component analysis has also been further subjected to Varimax Rotation. The Eigenvalue is the total variance explained by each factor. The Eigen values, the percentage of total variance, and rotated sum of squared loadings have

been shown in Table 9. Any factor that has an eigenvalue less than one does not have enough total variance explained to represent a unique factor and is therefore disregarded. The Eigenvalues associated with each factor represent the variance explained by that particular linear component and SPSS displays the eigenvalues in terms of the percentage of variance explained. An examination of Eigen values has led to the

retention of three factors. These factors have accumulated for 37.%, 14.32%, and 11.82 % of variation respectively. This implies that the total variance accumulated for by all three factors is 63.17% and remaining variance is explained by other factors.. So factor 1 explains 37% of total variance. It is clear that first few factors explain relatively large amounts of variance where as subsequent factors explain a small amount of variance.

Table 10: Communalities

	Initial	Extraction
Easiness	1.000	.288
Usefulness	1.000	.585
Enjoy	1.000	.659
Social influence	1.000	.622
Concentration	1.000	.621
Playing context	1.000	.813
Personal attitude	1.000	.682
Intention	1.000	.720
Behaviour	1.000	.697
Extraction Method: Principal Component Analysis.		

Table 11: Component Matrix

	Component		
	1	2	3
Easiness	.788		
Usefulness	.720		
Enjoy	.685		.406
Social influence	.676		
Concentration	.644	-.481	
Playing context	.594		-.454
Personal attitude	.489		
Intention		.734	.520
Behaviour	.506	.508	
Extraction Method: Principal Component Analysis.			
a. 3 components extracted.			

Scree Plot

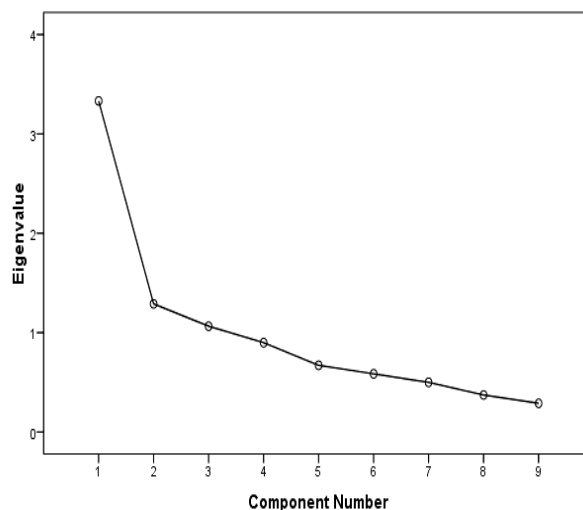


Figure 2: Scree Plot

h) Analysis of Communalities and Component Matrix

The communality is the proportion of variance accounted for by the common factors of a variable. Communalities range from 0 to 1. Zero means that the common factors do not explain any variance and one means that the common factors explain all the variance. The communalities of the column leveled extraction reflect the common variance in the data structure. It is observed that 28.8 percent of the variance associated with question 1 is common or shared variance. It is seen from the result that relatively high numbers that is a good result. The component matrix indicates how each item of the analysis correlates with each of the three retained factors. Negative and positive correlations carry the same weight. The component matrix contains the loadings of each variable onto each factor. At this stage SPSS has extracted 3 factors. All loadings less than .40 is suppressed in the output that's why there are blank spaces for many of the loadings.

i) Scree Plot

A Scree plot is a graph that plots the total variance associated with each factor. It is a visual display of how many factors there are in the data. It is seen that although there are 9 principle components only three factors have eigenvalues over one. It is expected that three principle components in the data. The curve indicates the inflexion on the curve.

j) Rotated Component Matrix

The Rotated component matrix indicates how each item correlates with each factor. The rotation of the factor structure clarified things considerably. There are three factors and variables load very highly onto only one factor.

Table 12: Rotated Component Matrix

	Component		
	1	2	3
Intention	.841		
Behavior	.804		
Personal attitude	.731		
Usefulness		.750	
Concentration		.740	
Social influence		.628	
Easiness		.492	
Enjoy	.478	.482	.445
Playing context			.901
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

IV. CONCLUSION

Modern and innovative technology offer lots of blessings for human betterments, a smart phone is one of them that is a mobile phone device which offers more advanced computing ability and Internet connectivity than traditional mobile phones. The advanced functionalities of a smart phone enable access to the Internet and the use of various applications such as mobile gaming, as well as phone calling and text messaging. In This study tested the correlations among mobile phone gaming adoption and some influencing factors such as behavior, playing context, usefulness, easiness, concentration, enjoyment, social Influence, intention, personal attitude in of Bangladesh. The study also revealed that the first three factors are the most important factors these influence the most adoption of mobile gaming. We see correlation matrix to check the pattern of relationships. We see that the majority of the values are greater than 0.05. So the relationships are correlated among variables. The result of the study also highlights the pattern of relationship among variables that were proved by the analysis. The contribution made by the study is give suggestions for the operators of mobile phone to consider the above mentioned factors while designing their offerings for customers to get the maximum benefit by satisfying mobile phone gaming users in Bangladesh. Marketers should, however, carefully consider the key factors that influence the adoption and performance the operations of mobile phone gaming. Despite several meaningful findings, the study is not without limitations. Above all, the results are limited in terms of generalizability because the samples used in the current study did not cover a wide range of demographics in terms of age, ethnicity, employment, income, and education. Thus, future research is recommended to further investigate

determining factors more closely by including extended demographics variables.

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