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15

## How experience affects technology acceptance: A quest for ICT development strategies in Bangladesh

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### Abstract

*Despite an increasing amount of initiatives and policy priorities remain in Bangladesh for ICT development and establishing an e-based society by 2021, lower level of internet penetration made the whole initiatives inconclusive although there are enormous potentials. This study attempts to examine individuals' intention and actual internet usage behaviour applying an extended version of technology acceptance model (TAM). A descriptive research design was administered in explaining the joint impact of the study constructs. Structural equation modeling approach was used with the data collected from 291 individuals in Bangladesh through a questionnaire survey. The proposed model was first measured through factor loadings, composite reliability and the constructs correlation for convergent and discriminant validity. The structural model estimation results show that experience has direct significant relation with perceive ease of use, intention and actual behaviour and indirect relation with perceived usefulness through perceived ease of use. On the other hand, perceive usefulness has direct effects on intention while perceived ease of use doesn't but indirectly related through perceived usefulness. The path analysis furthered the significant effects of intention on actual internet usage behaviour in Bangladesh. The study concludes with implications.*

**Keywords:** Internet, intention and actual behaviour, technology acceptance model, perceived ease of use, perceived usefulness, experience

### I. INTRODUCTION

Technology acceptance and its usage, particularly information and communication technology, has received bulk of researchers attention in recent years. A growing body of academic research on technology acceptance has been observed in different parts around the world while the initiatives and development in Bangladesh context is inconclusive, although the country has adopted a promising plan to establish digital Bangladesh by 2021.

The present government of the country has given highest priority and initiated diversified policies and programmes to achieve the digital goal manifested in the national election 2009 and post election agenda. The country's national budget for 2010-2011 allocates substantial amount of resources for ICT development and reiterates expanding the ICT networks to the rural communities to achieve government, citizen and business interactions and exchanges through internet [1]. As a part of development initiatives the government also initiated some

modifications of the country's national ICT policy in 2009 which reiterates the necessity of establishing e-government, e-services and e-commerce environment in order to gain economic potentials. It also emphasizes on formulating appropriate policies and strategies for facilitating internet related communication, e-commerce operation and e-governance. In order to achieve ICT potentials the government is dedicated to utilize internet in education and service sectors [2-4]. Despite the promising development initiatives, the country will not be able to achieve the digital benefit if they couldn't manage to ensure peoples' increasing digital participation.

Although Bangladesh has already eliminated many of the hurdles and obstacles of ICT adoption reflected in the previous studies such as, limited accessibility to internet, poor teledensity, poor electricity network, limited affordability of computer and knowledge, inadequate legal and regulatory supports, inefficient and traditional systems of banking operation, poor financial support and traditional payment mechanism, lack of human resource, high Internet usage cost as well as security [5-7] [2] [8-10], the country's lower internet penetration is the vital problem for establishing e-based transparent society. According to World Bank [11] the internet penetration of various countries are estimated as follows: USA 75.9%, UK 76%, Australia 70.8%, Singapore 69.6%, Malaysia, 55.8%. While Bangladesh's internet penetration is only 0.347% in 2008. While many developed and developing countries achieved significant advantages through computerisation of government departments, business firms and educational institutes, the digital initiatives of Bangladesh remain at risk due to poor internet penetration. In this context this study looking at individuals ICT acceptance behaviour in Bangladesh has great significance.

Most of the previous studies examined ICT adoption behaviour in Bangladesh through utilization of Rogers Innovation Diffusion Theory, Theory of Planned Behaviour and Theory of Reasoned Action, while some empirical studies include individuals' beliefs and perceptions as well as some cultural aspects [2] [5] [7] [8-10][12-13]. The Technology acceptance model (TAM) although believed to be robust and parsimonious model for ICT adoption and which is also widely used in different parts around the world [14-17], its application in Bangladesh is not well researched. This paper thus looks at the effects of experience account for intention to use internet as well as actual behaviour in

modeling with the two fundamental users' beliefs in TAM and draws some implications for increasing internet usage trend in Bangladesh.

## II. THEORETICAL FRAMEWORK AND HYPOTHESES

### A. Theoretical framework

Numerous theories and models have been used to investigate technology acceptance phenomena in the past couple of decades, most of them are adapted from Rogers Innovation Diffusion Theory [18], Theory of Reasoned Action [19-20], Theory of Planned Behaviour [21-22] or Technology Acceptance Model [14-15]. Although Rogers's theory is the oldest theory among these four and TAM is the most recent one, every theory has its own utility and they are still being used, some times replicated, in different adoption studies [13].

Analyzing the scope and structure of the models and their applicability into different environment researchers find some uniqueness and also some limitations in the theories that encourage new researchers to look into the theories for reconstruction and modification. In reviewing the technology adoption research, particularly ICT acceptance studies, the technology Acceptance model (TAM) is found as one of the most widely used theoretical frameworks. TAM received numerous researchers' attention to utilize and replicate it in different parts around the world in different contexts due to its parsimony and the wealth of recent empirical support for it [14-17] [23].

The technology acceptance model [14-15] has been rooted from Theory of Reasoned Action [19-20]. According to TAM the adoption behaviour of a new information system is determined by the users' intention to use the particular system which in turn is determined by the users' two beliefs, perceived usefulness and perceived ease of use. Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance his or her job performance. On the other hand perceived ease of use refers to the extent to which a person believes that using particular system will be free of effort. Among these two beliefs, perceived ease of use is hypothesized to have a direct effect on perceived usefulness.

The earlier version of TAM included subjective norms with perceived ease of use and usefulness as antecedents of behavioural intention which was omitted from the model latter. Social influence has strong effect in technology adoption in mandatory setting while it has different effects in voluntary setting and in the context of having experience [24]. One key benefit of using TAM to understand system usage behaviour is that it provides a framework to examine the influence of external factors of system usage [25].

Various external variables such as computer self efficacy, social influence, experience, voluntariness, diversity of technology, trust, culture, and relevance, have been added in the context of TAM in different settings to get more insight of technology acceptance in previous initiatives [15] [23-29] [31] [45]. Although experience is a strong variable which can reduce the cognitive dissonance as well as some other

confusion about the performance of the technology and users capacity to use, it is relatively under researched. In some previous studies experience was modeled as a moderating variable to examine its influence in-between Intention and actual behaviour, Perceived ease of use and perceived usefulness, perceived behavioural control and behavioural intention, perceived ease of use and attitude, subjective norms and perceived ease of use, external computer support and perceived ease of use, objective usability and perceived ease of use, and perceived enjoyment and perceived ease of use [27] [29-30].

In Bangladesh people are living within a close social tie where physical existence is very important in almost all communication and transactions which is also considered as an avenue for social contact and recreation [12]. Since internet is inherently a non-personal media of communication and generally programmed in English language, the common people of Bangladesh may feel puzzled and grope although perceived it as easy and useful technology. The amount of experience in internet related activities should logically remove the confusion and indecision in technology adoption. This study thus adopts experience as an added factor in parsimonious TAM model to look into the effects of experience as an antecedent of intention, use as well as perceived ease of use and perceived usefulness (see figure 1).

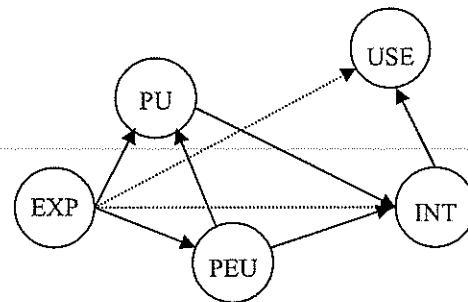


Fig.1 Conceptual Model

### B. Hypotheses

Based on the above discussions the following hypotheses have been proposed:

H1a: Experience has direct positive effects on perceived usefulness.

H1b: Experience has direct positive effects on perceived ease of use

H1c: Experience has direct positive effects on intention to use

H1d: Experience has direct positive effects on actual usage behaviour

H2a: Perceived ease of use has direct positive influence on intention

H2b: Perceived ease of use has direct positive influence on perceived usefulness

H3 : Perceived usefulness has direct positive effects on intention

H4 : Intention has direct positive influence on usage behaviour

### III. RESEARCH METHODOLOGY AND FINDINGS

Individuals belong to different class, occupation, academic attainment, and income, although internet user or non user, form the population of the study, since the study is dedicated to examine the behavior of Bangladesh's individuals to use internet in accomplishing various functions. The study is also an attempt to test the effects of individual differences in explaining the intention and actual usage behaviour in regard to predict the internet usage behavior in Bangladesh. The study undertakes an empirical study quantifying individuals' responses through technology acceptance model. In accordance with the proposed model survey instrument is administered to the sample which is determined through non-probability purposive convenient sampling method. Data were gathered through a self administered structured questionnaire. The measures used to operationalise the constructs included in the proposed model were mainly adapted from relevant prior studies, with slight modification and expressional changes to fit them to the targeted context. All items were measured using a 7 point Likert-type scale with anchors on strongly agree and strongly disagree, respectively. Total 300 questionnaires were supplied for the study while 291 complete questionnaires were received and finally used for the purpose of the analysis.

#### A. Subject and Sample

Although the study utilizes non probability convenience sampling technique the individuals' belonged to different class, income, education, and profession were tried to be included in the survey to make the logical ground of generalising the inferred outcomes.

The study investigates perceptions of present and potential internet users from different location of Rajshahi City, a Divisional Metropolitan City in Bangladesh. The sample consists of 36.1% Service holder, 19.2% Businessmen, 18.9% students and 9.6% professional (Doctor, Engineer, Lawyer, Journalist, teacher etc.) and 10.3% others category (self employed or even unemployed).

7.2% of the individuals surveyed have primary education, 7.9% of the respondents have up to S.S.C. level of education, 17.5% have H.S.C. certificate and 39.5% have Bachelor Degree, while 21.3% respondents have Masters Degree and other higher educational qualifications. The study includes 37.4 % individuals with the age bellow 25 Years, 37.5% with 25 Years to 34 Years, 17.5% with 35 Years to 44 Years, while 7.60% of the respondents fall into the category of 45 Years and above age. In addition to the above classifications the study includes 79.0% male respondents and 21.0% Female respondents. 78.7% respondents live in urban area and 53.3% respondents have internet connection.

#### B. Data Analysis and results

The data gathered from the survey were analysed by partial least squares (PLS) based structural equation modeling

[32]. Structural equation modeling (SEM) is a confirmatory approach to data analysis [33] which provides a unique opportunity to test the measurement model and path model simultaneously. This study used the standard PLS analysis of the individual item reliability, composite reliability and discriminant validity, to assess the adequacy of the measurement model [32] [34].

#### B.1 Measurement model

The measurement model was assessed prior to the test of structural model. Psychometric properties of the measurement model in terms of reliability, convergent validity and discriminant validity were examined at this phase of analysis [35]. Reliability scores of all items exceeded the threshold value .70 suggested by Nunnally and Bernstein [36] (see table 1). Thus factor loadings of each item on all of the constructs were highly satisfactory providing evidence of satisfactory item convergence on the intended constructs. Internal consistency (or construct reliability) is the second reliability measure to evaluate the measurement model. Table 1 shows that all internal consistencies exceed the threshold value of 0.7.

This study used the square root of the AVE and cross loading matrix to assess the discriminant validity as suggested by Igarria et al. and Barclay et al. [16] [32]. According to Barclay et al. [32], the model is assessed to have acceptable discriminant validity if the square-root of the AVE of a construct is larger than its correlation with other constructs. The results are detailed in Table 2 with the square roots of the AVEs shown in the main diagonal of the table. The off diagonal elements represent the correlations among the latent variables. Table 2 indicates that the discriminant validity of the latent variables was met, which means that all the latent variables are different from each other.

The second discriminant validity criterion states that no item should load higher on another construct than the construct it is supposed to measure [32]. Results of the cross-loading analysis showed that all items loaded higher on the construct that they were measuring than they did on other constructs in the model. To save space, the cross-loading matrix is not presented in this paper.

#### B.2 Structural model

The structural model deals with testing the hypothesized relationships. Bootstrap method has been used to test the hypotheses.

The results detailing the path coefficients and t-statistics are summarised in Table 3. It is observed that among the primary hypotheses H1b, H1c, H3, H4 were supported (significant t-values), while hypotheses H1a, H2a, and H2b were not supported (insignificant t-values). According to Santosa et al. [38] the nomological validity or explanatory power of the proposed model can be assessed by observing the  $R^2$  values of the endogenous constructs. The model explains 50.5% of the variance ( $R^2$ ) of the Intention to adopt (see Figure 2 and Table 3). All  $R^2$  values exceeded the minimum required value of 0.10 as suggested by Falk & Miller [39] ( seeTable 3 and Figure 2).