The Adoption of Automatic Teller Machines in Commercial Bank of Ethiopia

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Abstract: **- ATM banking is a crucial aspect of today's applied technology that offers unlimited possibilities as a strategy to attract and retain customers. In addition to that it has changed the pattern in performing their business. The Ethiopian banking industry is also shifting in the advent of this ATM technology to put both the banks and the customers in a win-win situation. Hence, the researcher attempted to study on the adoption of Automated Teller Machine (ATM) in Commercial Bank of Ethiopia (CBE) in Addis Ababa. The study was descriptive in nature and data were gathered through questionnaires and document analysis. In order to achieve the objective of the study, mixed use sampling techniques were used. A sample size of the study was (n = 320). Data collected with structured questionnaire was analysis by inferential statistics. The major results were the determinant variables have significantly affected the adoption of ATM in CBE in the case of Addis Ababa customers. Based on these findings, conclusions were drawn and some feasible recommendations were made.**

***Keywords*: - ATM, Adoption, Commercial Bank of Ethiopia**

I. INTRODUCTION

A smart person no longer needs to carry a wallet-full of paper money on the pocket. All they need to do is fish out an ATM (automated teller machine) card, insert it in the slot, punch in a few details and go home with hard cash. Nowadays most of peoples in the world are being adopting ATMs.

The first ATM was developed and built by Luther George Simjian and was installed in 1939 in New York by the CitiBank of New York. Though, it was removed after six months due to lack of customer acceptance (http://en.wikipedia.org/wiki/automatic teller machine). The ATM services have gone through many stages. Abor (2004) to the present day innovation where they do other functions like, funds transfers from one account to the other and paying bills- beside their sole role of cash dispensing.

ATM banking is thus an important innovation that has the potential of overcoming the disadvantages arising from having human bank tellers at the center of the banking transactions; and reducing the banking costs in the long run (www.americanbanker.com). It is commonly accepted today that ATM technology has significant effects on the productivity of the organization and individuals. These effects will only be fully realized if, and when, the technology are widely spread and used.

1.1 Overview of CBE

CBE was legally established as a share company in 1963, it is the first bank in Ethiopia to introduce ATM services in 2001. It is the leading bank in the Ethiopian banking market with more than 1,160 branches and 1,027 ATMs stretched across the country and with assets of 384.6 billion Birr as on June 30th 2016 (www.combanketh.et). Currently, CBE has more than 13.3 million account holders and the number of Mobile and Internet Banking users also reached more than 1,352,000 as of September 30th 2016 (68% active users). Moreover, 61% of its 3 million ATM card holders are active ATM Banking users for cash withdrawals, bill payments, forex transactions, fund transfers, balance inquiries and so forth (CBE, 2016 Annual report). However, despite the fact that the ATMs are strategically installed in branches, hotels, malls and other public places, the Bank's only 22.5% of the total CBE's customer being used ATM at the end of 2016. Efforts to improve access for its customers by increasing the number of machines are beset by many structural and operational challenges that will be discussed at a later stage in this study.

II. STATEMENT OF THE PROBLEMS

Although, ATMs provide alternative self-banking delivery services such as withdrawals, pay utility settlement, and transfers on 24 hours a day for 7 days in a week basis without the help of bank personnel's (Jemal, A. &Naser, K., 2002); and all Ethiopian commercial banks are investing huge capital to provide banking services to their customers through them, long queue to get served by tellers remain common in the Ethiopian Banking industry. There is believed that the available free ATM machines at the gate of the banks and other public centers offer a more efficient mode of service delivery- as compared to the use of tellers, although the gaps regarding with the adoption of ATM make them far less popular. It's in this light that the study seeks to study the problems of adoption of ATM Banking in Ethiopia- with specific reference to the commercial bank of Ethiopia (CBE).

III. OBJECTIVES OF THE STUDY

The study seeks to:

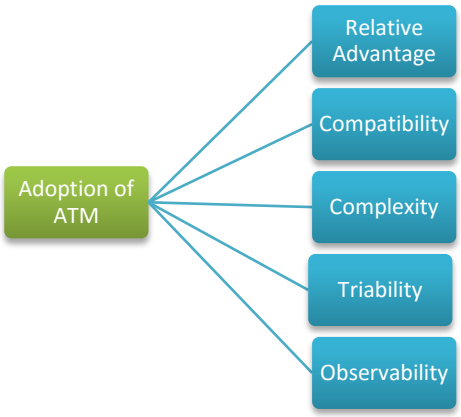
I. Examine the effect of technology adoption attribute on the adoption of ATM in CBE.
II. Identify factors that affecting the adoption of ATM's in CBE.

IV. THEORETICAL FRAMEWORK FOR ATM ADOPTION

Technology adaptation and diffusion contributes a lot to the economic growth of the country and to lead the market in the business. Adoption brings committed, continual use of an innovation whereas diffusion results into a wide usage of the benefits of the new invention thorough a series of widespread individual decisions to use the new technology (on a massive scale). An understanding of the factors affecting this choice is essential both for practitioners and researchers, and its for this reason that CBE has been chosen as the case study. For some time, researchers have concentrated on identifying the factors that could facilitate the adoption of an innovation. Roger's Diffusion of Innovation (DOI) theory (1995) was emphasizes the attributes of ***Relative Advantage*****:** the degree to which an innovation is perceived as being better than the idea it supersede and ***Compatibility***; the degree to which an innovation is perceived as consistent with the values and needs of potential adopters. Roger's theory further emphasizes ***Complexity:*** the extent to which a targeted adopter can easily understand and use an innovation/technology. It is logically to deduce that the harder an innovation is (or is perceived to be hard to use), the less likely potential adapters would accept to consume it. The accelerated rate of rapid adoption after a successful trial is based on ***Trialability:*** the capacity of the consumer to give the innovation a try or test before deciding to adopt it or not. This is closely related to ***Observability:*** *the* degree to which the results of an innovation are visible to the adaptors- and others as well.

In this study, the Rogers (1995) model regarding the adoption of a technology was central to the concept of ATM Banking in area of the study (Addis Ababa), as amplified thus:

Figure 1: ATM Technology Adoption Model



Research Model (adopted from Rogers, 1995)

V. HYPOTHESIS

From the above model, the followings were the hypothesis proposed for this study:

H1. There is no significant relationship between technology adaptation's attributes (Relative Advantage, Complexity, Compatibility, Trialability and Observability) and Adoption of ATM

Sub-Hypothesis:

H1a: There is no significant relationship between Relative Advantage and Adoption of ATM.

H1b: There is no significant relationship between Complexity and Adoption of ATM.

H1c: There is no significant relationship between Compatibility and Adoption of ATM.

H1d: There is no significant relationship between Trialability and Adoption of ATM.

H1e: There is no significant relationship between Observability and Adoption of ATM.

VI. METHODOLOGY

The descriptive research design was employed through survey approach. Both secondary and primary sources of data used in this study. The sample size concerned for the collection of primary data, the researcher used CBE's customers in Addis Ababa city. The city is stratified into ten sub-cities. Out of them, four were selected by using simple random sampling techniques (Arada, Bole, Kolfe-Keranyo and Ledeta sub-cities). The number of respondent was assigned with disproportional sampling techniques. That is 80 respondents from each selected four sub-cities. Questionnaires were distributed by using simple random sampling techniques in different places in the sub-cities. Questionnaires were distributed for 320 respondents and 308 questionnaires were completed and used for the analysis. Primary data were entered in to the SPSS and analysed by using inferential statistics.

VII. DATA ANALYSIS

A. Correlation Analysis

In order to define the direction of the relationship between the variables and evaluate the magnitude (between -1 and +1), Correlation analysis was employed. This particular type of analysis is useful when a researcher wants to establish if there are possible connections between variables (Adoption, Relative Advantage, Complexity, Compatibility, Observability and Trialability).

Table 1: Summary of Correlation Coefficients

		Attitude	Relative Advantage	Complexity	Compatibility	Observability	Trialability
Adoption	Pearson Correlation	1					
	Sig. (2-tailed)						
Relative Advantage	Pearson Correlation	.672**	1				
	Sig. (2-tailed)	.000					
Complexity	Pearson Correlation	.715**	.921**	1			
	Sig. (2-tailed)	.000	.000				
Compatibility	Pearson Correlation	.871**	.832**	.843**	1		
	Sig. (2-tailed)	.000	.000	.000			
Observability	Pearson Correlation	.778**	.804**	.757**	.874**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
Trialability	Pearson Correlation	.848**	.704**	.707**	.877**	.784**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

*Correlation is significant at the 0.01 level (2-tailed).

Source: Survey data

The above table 1 shows that the simple bi-variant correlations between various variables under study. It was explained that the dependent variable (Adoption of ATM) was found to be significantly ($p<0.01$) associated positively with the independent variables (Relative Advantage, Complexity, Compatibility, Observability and Trialability). The significant association between the dependent variables and the independent variables was reported from higher to lower as follows: *Compatibility (0.871), Trialability (0.848), Observability (0.778), Complexity (0.715), and Relative Advantage (0.672) correlate with significant at the 0.01*.

This value has shown that there is a very strong positive correlation between the variables. It means that with the increase in the Adoption of ATM provided it will result in increase in the level of determinant variablesamong the customers. These results are also consistent with the one studied on Nigerian population by Olatokun and Gbinedion (2009), El-Haddan and Almahmeed (1992) studied a Kuwaiti population, and Marshall and Heslop(1988) studied a Canadian population. Hence, the above attributes have strong relationships with customers'ad option for the use of ATMs.

B. Regression Analysis

Multiple Regressions are used to calculate that whether there is positive or negative relationship between the dependent and independent variables.

The following tables present the results from the multiple regressions carried out using the five variables: Relative Advantage; Complexity; Compatibility; Observability and Trialability as the independent variables and adoption of ATM as the dependent variable. This was done to determine the best linear combination of the variables for predicting adoption of ATM.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.896[a]	.803	.800	.36567

a. Predictors: (Constant), Trialability, Relative Advantage, Observability, Complexity, Compatibility

Source: Survey data

Model summary (table 2) of output is very important in describing overall relationships between dependent and independent variables (R), goodness of fit (R square) and the standard error of estimate.

In order to determine the strength of relationship between those variables**,** a value of R which is assumed to be 0.896 was established to show that the relationship between dependent and independent variable is very strong. Results have shown that 89.6% variations are caused by independent variable.

Similarly, R^2 value shows us how close the data are to the fitted regression line. Thus, the overall predictability of the model is shown in the above table. The R^2 value of 0.80 indicates that model explains 80% of the attributes are responsible for overall customer adoption of ATM. It means that there exist a positive relationship between all independent variables and a dependent variable. Moreover, this model shows a figure of standard error of estimate i.e. 0.366, meaning that actual data is 36.6% dispersed from the regression line.

Table 3: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	165.617	5	33.123	247.723	.000[b]
	Residual	40.515	303	.134		
	Total	206.132	308			

a. Dependent Variable: Adoption of ATM

b. Predictors: (Constant), Trialability, Relative Advantage, Observability, Complexity, Compatibility

Source: Survey data

Above ANOVA, table 3 has shown that P-value is much less than 0.01, meaning that there is a significant impact between the variables. Hence, the model is accepted. So, it tells us that there is strong impact of Trialability, Relative Advantage, Observability, Complexity, and Compatibility on customer adaptation of ATM.

Table 4: Regression M**odel (**Coefficients**)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.038	.136		-.277	.782
	Relative Advantage	-.308	.068	-.325	-4.517	.000
	Complexity	.236	.081	.207	2.903	.004
	Compatibility	.567	.083	.549	6.861	.000
	Observability	.167	.070	.133	2.372	.018
	Trialability	.354	.055	.345	6.425	.000

a. Dependent Variable: Adoption

Source: Survey data

Adoption of ATM = **f**(Trialability, Relative Advantage, Observability, Complexity, Compatibility) mathematically it can be written as:

Where,

Y = Customer Attitude

X1 = Relative Advantage

X2 = Complexity

X3 = Compatibility,

X4 = Observability

X5 = Trialability

There α is constant while βi are coefficients of estimates and e is the error term.

$Y = \alpha + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \beta 5x5 + e$

Using the regression output from the above tables, estimated the following relationship model:

$Y = -0.38 - 0.308X1 + 0.236X2 + 0.567X3 + 0.167X4 + 0.354X5$

Testing the Hypotheses

As depicted on the above model, all independent variables are useful to predict the adoption of ATM in the case of CBE. Relative Advantage ($\beta = -0.325$, $P<0.005$) was found to have a significant effect on the adoption of ATM. As a result of this, Hypothesis (H1) is **rejected**. As customers responded, the advantages of using ATMs have made them prefer to ATMs than the traditional transactions/bank tellers with considered save time, accuracy and reduced costs. The significant contribution of Relative Advantage to the adoption technology is consistent with previous research involving information system acceptance (Horton et al., 2001).

Regarding with the Complexity variable shows ($\beta = 0.207$, $p < 0.05$) was significant relations to the adoption of ATM. Therefore, Hypothesis (H3) is **rejected.** Findings from this study suggested that ATMs were easy to use and more likely to be more widely adopted. However, it contributed less than Relative Advantage and Compatibility to the above model. The significant contribution of Complexity to the adoption model has already been earmarked by various scholars like Kolodinsky et al. (2004) and Chen et al. (2002).

The result of the regression analysis in the above table 4, shows Compatibility had the major effect on the ATM adoption in CBE with ($\beta = 0.549$, $p < 0.05$). The Beta value of Compatibility is 0.549 which indicates that 100% change in usage pattern leads to 55% change in overall attitude at P-value 0.000 which is significant relation with the adoption of ATM. From the responses that ATM products are compatible with user requirements, life style and considered local language. As a result of this, Hypothesis (H3) is **rejected**. This finding is also consistent with the result found by Friday and Mary (2013).Similarly, McKenzie, 2001; Sherry, 1997) observe that a lack of Compatibility in IT with individual needs may negatively affect the individual's use of the innovation.

As per the above model indicates, Observability ($\beta = 0.133$, $p < 0.05$) was found that significant relationships to the effect on ATM adoption in CBE customers. As a result of this Hypothesis (H4) is **rejected**. As the finding of the study,ATM is usually found in public places and less queue while using ATM. However, comparing with the other four variables it has less effect to adopt ATM in CBE's customers.

The last variables in this model, Trialability ($\beta = 0.345$, $p < 0.05$) was found that significant relationships to the effect on ATM adoption in CBE's customers. As a result of this, Hypothesis (H4) is **rejected**. The results of this study implied that the respondents have attempted to try ATMs before

adopting its use. Hence, a customer who can use ATM at one place can operate ATM on another place. Therefore it can suggest that potential adopters of ATM may well benefit from trial demonstrations as an introduction to using the technology. However, the significance contribution of Trialabilityto the adoption model was inconsistent with the finding of Fraday and Mary (2013).

VIII. CONCLUSION AND SUGGESTIONS

The interaction and combination of these attributes (Relative Advantage, Complexity, Compatibility, Trialability and Observability) would have significant impact on users' adoption of ATM in CBE. As the result shows, compatibility is the highest predictor than the others on the effect to adopt ATM. Thus, it can conclude that CBE's provided ATM technology is fitted with their customers' life style. So, banks should give much attention on customers' current status and demand before enforcing the technology. Moreover, the remaining attributes also significantly affect to predict the adoption of ATM in CBE. Hence, the combination of these attributes meet users' expectations and/or specific needs for the technology to be properly adopted. Thus, banks should see to the development and design of less complex and easy to use systems that do not require a lot of mental and physical effort to accomplish transactions.

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