

Factors Affecting Adoption of Online Electric Bill Payment Systems: A Study on Selected Postpaid Customers of Ethiopian Electric Utility (EEU) in Addis Ababa

Deresse Mersha Lakew

Department of Public Financial Management and Accounting, Ethiopian Civil Service University

Email: deresmersha@gmail.com

Abstract

Ethiopian Electric Utility (EEU) is the sole public enterprises responsible to administer electric distribution network, sell electric energy to customers and collect electric bills. The main objective of this study is to examine the level of adoption of online payment system and identify factors affecting the choice of payment methods. Data for the study were collected from postpaid customers in Addis Ababa city. Multistage sampling methods were used to select the sample respondents including household and institutional customers and data were collected using survey questionnaire. In-depth interview was conducted with Key informants from EEU, Addis Ababa regional office. In addition, pertinent secondary data were collected from EEU Addis Ababa regional office and used in the study to support the primary data. Both descriptive and inferential statistical tools were used to analyze the collected data. Innovation Diffusion Model was used as a conceptual model for the study. The finding of the study showed that only less than a quarter of the respondents have started paying their electric bill online through CBE birr, Mobil banking or Telebirr. The use of online bill payment were found to be significantly associated with age, gender, employment status, education level, amount of monthly bill and distance from customer service centers. In addition, simplicity and communication through mass media were found to be significant factors affecting adoption of online payment system. In order to increase the adoption rate of the online methods, EEU is advised to further simplify the online system and promote the system through TV, Radio and Social media.

Keywords: Addis Ababa, Bill collection, Ethiopian Electric Utility, Innovation Diffusion Model, Online payment,

1. INTRODUCTION

Ethiopian Electric Utility is the sole public enterprises that distribute electric power to customers collecting payment from them. The customers of EEU include household customers, commercial customers and industrial customers. The majority of the customers of EEU are household customers in terms of number, but the major electric energy users in terms of KWhrs are industry costumers (EEU, 2022).

The national level preliminary data collected from EEU showed that, a significant portion of the planned bills were not collected in the year 2020/21. This might be because customers are not paying their bill as result of different reasons emanating from customers or the utility company. On the other hand, still EEU depends on financial supports from World Bank, African Development Bank, and European Union (Ethiopian News Agency, Thursday, May 31, 2018). This is an indication of resource mismanagement where the company does not properly collect its own revenue but depends on lenders or donors resources.

Reforming the service delivery and supporting it with Information technology is critical to reduce mismanagement of resource, enhance customer satisfaction and proper collection of electric bills. Among the reforms introduced by EEU are electronic billing methods which are online payment systems for monthly bills. They enable consumers to pay their bills by digital means after they view the amount online. Actors in electronic billing include users, commercial banks, Ethio telecom and EEU. A substantial amount of cost is incurred in the traditional cash based payment from the time the bills are issued to the time they are paid by customers. Therefore, electronic payment systems reduce considerably the cost and time associated with processing and paying bills (EEU, 2020).

EEU has introduced different online bill collection methods such as mobile banking, CBE birr, internet banking and telebirr to enhance customer's service and its own revenue. But the report of EEU (2022) and previous study by Walta Information and communication center (2021) indicates that only small numbers of customers are adopting these online payment methods. Although there is a low level of adopting technology among customers of EEU, to the knowledge of the researcher, there are no studies that examined the factors contributing for the low level of technology adoption in electric utility bill payment. The purpose of this study is therefore, to identify factors that determine adoption of online payment system taking evidence form EEU, Addis Ababa regional office.

This paper is organized as follows. The next section describes the statement of the problem. Section three presents the objectives of the study. The fourth section outlines the methodology followed to achieve the objectives. The fifth section presents the result and discussion and finally, the last section presents the conclusions and recommendations related to the study.

2. STATEMENT OF THE PROBLEM

EEU provides electricity service to more than three million customers throughout the country. The future objective of EEU is to distribute electricity service to all citizens of the country. However, reports in different media outlets shows problems related to electric bill collections exist. In order to improve the bill payment system, EEU has recently introduced online payment system in collaboration with Commercial Bank of Ethiopia and Ethio telecom. Although, such

efforts have been exerted to enhance customer service in general and bill collection in particular, the report from EEU (2022) and the study by Walta (2021) indicated that the technology adoption rate is very low and complaints are received from customers every day. Digital financial literacy is a challenge among consumers and not all consumers have made the shift to digital payments because of several factors.

There are few local studies that tried to examine challenges associated to service delivery of EEU (Aman, 2016; Fikre, 2010; Teklehaimanot, 2007 and Walta, 2021). However, these previous studies focused on challenges in general service delivery and did not specifically investigate the challenges associated to bill collection. On top of this, most of the previous local studies used descriptive methodology that does not clearly indicate the true significance level of the problem at hand. This specific study tries to fill this gap by studying the factors associated to online electric bill payment system taking sample EEU customers from Addis Ababa City.

3. OBJECTIVES OF THE STUDY

The general objective of this study is to identify factors that affect adoption of online electric bill payment methods. Specifically the study is aimed to

1. Examine the difference in adoption of rate among the diverse group of customers
2. Identify factors affecting adoption of online payment methods by Customers of EEU

4. REVIEW OF RELATED LITERATURE

There are many theories that can help to explain factors determining adoption of new technology or innovation. However, Innovation Diffusion Theory developed by (Rogers, 1983) was selected for this study since it was found to better explain adoption rate of e-payment related innovations. Previous empirical evidence showed that there are several factors that affect adoption of online payment system. The empirical evidence and the hypothesis on each of these factors were outlined as follows.

a. Relative Advantage:

Adopting new technology has several benefits as compared to the traditional cash based methods. For instance, advantages in online payment as compared to the traditional cash based payment may include time and cost saving and being convenient for making payment from anywhere online. Making payment online using internet can save transaction cost not only for customers but also for banks (Lichtenstein and Williamson, 2006; Floh and Treiblmaier, 2006). The empirical evidence of the study by Abebe and Lessa (2020) also indicated that relative advantage is the first important benefits that merchants in Ethiopia obtained while making payment online using mobile banking. Based on this, it can be hypothesized that:

Hypothesis 1: Relative advantage of the online payment system has a significant positive effect on adoption of online payment for electric utility consumption.

b. Compatibility:

The compatibility of new technology indicates the extent to which the new innovation goes with the life style and experience of users. The extent of compatibility of an innovation affects adoption rate of an innovation. Thus, Rogers (1983) argue that adoption of new innovation can be easier when it is well-suited to customers' behavior, life style, experience and working condition (Rogers, 1983). Based on this, it can be hypothesized that:

Hypothesis 2: Compatibility of the online electric payment system has a significant positive effect on adoption of online payment for electric utility consumption.

c. Simplicity:

Simplicity is the degree in which new innovations are free from difficulty to use in making payment (Davis, 1989). A high level of simplicity of an innovation can be a strong stimulus for adoption of the new technology. In connection to this, the empirical evidence of the study by Abebe and Lessa (2020) also indicated that simplicity is the second powerful factor determining Mobile payment by merchants in Ethiopia. Based on this it can be hypothesized that:

Hypothesis 3: Simplicity of the online electric payment system has a significant negative effect on adoption of online payment

d. Trialability:

The trialability of a new technology is the extents in which the innovation can be tried again and again until the customer become proficient in using the innovation. Rogers (1983) argues that customers who are allowed to tryout the new innovation again and again develop confidence in the technology. If consumers are given the right to try the innovation again and again, certain fears of the unknown can be reduced significantly. With respect to internet banking, Tan and Teo's (2000) found that trialability is importance for internet banking users. In line with this, Chung and Paynter (2002) also found that lack of prior experience in internet banking has caused low adoption rate. Based on this it can hypothesize that:

Hypothesis 4: Trialability of the online electric payment system has a significant positive effect on adoption of online payment.

e. Observability:

According to Rogers (1983), Observability of new technology is the extent to which adoption of an innovation by a particular customer is visible to other customers and the benefits are easily communicated. Based on this it can be hypothesized that

Hypothesis 5: Observability of the online electric payment system has a significant positive effect on adoption of online payment.

The second group of elements affecting the adoption of innovation are the communication channel used to inform users about the new innovation (Rogers, 1983).

f. Word-of-Mouth

According to Banerjee and Fudenberg (2004), word of mouth is learning the new technology or innovation from neighbors or peers through personal communication. In connection to this, empirical evidence by Sarel and Marmorstein, (2003) found that poor word-of-mouth communication contributed to low level of adoption rate of a new product. Furthermore, Rogers (1983) highlighted that personal communications are good means of convincing people about the new innovation. Based on this it can be hypothesized that:

Hypothesis 6: Communication of the online payment system through word of mouth significantly affects adoption of online payment system

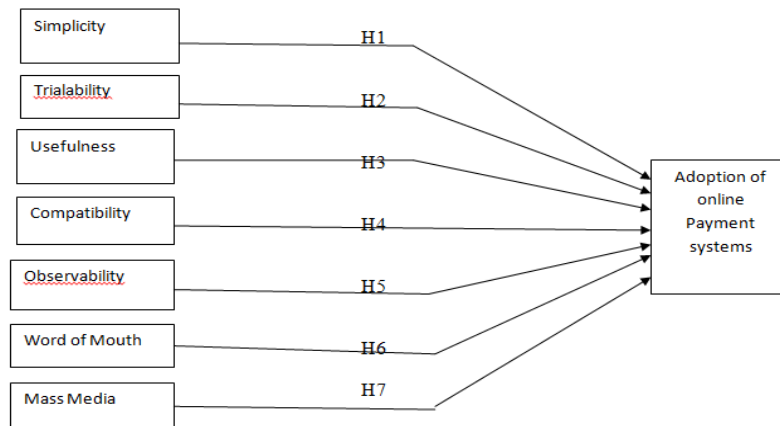
g. Mass Media

Mass Media is a means of informing about the new innovation so that it can easily reach a large number of audiences. Rogers (1983) argue that, mass media channels such as TV, Radio, and

other social medias are the most rapid methods of communicating new innovation to adopters. Khalifa & Cheng (2002) and Zolait & Ainin (2008) also found that mass media can play significant role in exposing customers to new technology. Based on this it can be hypothesized that

Hypothesis 7: Communication of the online payment system through the different mass media significantly affects adoption of online payment for electric consumption

In addition to the seven factors identified under IDT, there are other socio economic factors such as age, gender, education level, employment status, type of customers, amount of monthly bill, and distance from customer services centers that affect adoption of innovations. However, Rogers (1983) argue that the seven factors identified above will capture all other socioeconomic variables as well and using them together in the regression is not required. The conceptual model used in this study is therefore presented in the figure 1 below.



Source: Adopted from Rogers (1983) & Zoliat (2008)

Figure 1: Conceptual Model for the study

5. RESEARCH METHODOLOGY

Once the researcher has determined the specific questions to be answered, it is time to consider a suitable research design. In this study, both descriptive and explanatory research design are adopted. Especially, explanatory research designed helps to identify significant factors that affect adoption of online bill payment

The target population for this study was made up of the different groups of customers of EEU in Addis Ababa city which are estimated to be 803,758 till end of 2020 including both household and institutional customers (Walta, 2021). Yemane (1967) formula, assuming a marginal error of $\pm 4\%$ was used to determine a sample size of 624 respondents comprising customers of all the groups. After determining the total sample size, respondents were selected from the four districts in EEU Addis Ababa regional office. The 624 sample size was equally divided among the four districts namely North, South, East and West districts. Each district consists of nine customer service centers. Therefore, samples of three customer service centers were selected randomly from each districts leading to 12 customers service centers in total. Finally, 52 respondents including all categories were identified from each customer service centers. In addition, 13 Key informants were selected from the four districts for in-depth interview.

Both primary and secondary data collection tools were used in this study. Interview questionnaire was used to collect opinion from the different groups of customers. Key informant interview was conducted to triangulate the data obtained from customers. Further, secondary data related to bill collection performance were collected from EEU, Addis Ababa regional office.

Both descriptive and inferential statistical tools were used to achieve the objective of the study. Specifically, Chi-square test was used to examine the association between socioeconomic variables and adoption of online payment system. Rogers (1983) IDT was used to explain factors affecting adoption rate of e-payment related innovations. Rogers (1983) identified five attributes related to innovations and two communication attributes that have a strong influence on whether and how fast an innovation is adopted. The symbol and measurement for each of these variables in the conceptual model were outlined in the table 1 below.

Table 1: Symbols and Measurement for Variables used in the Analysis

Variables	Symbol	Measurement
1. Adoption of Online Payments	AOP	0 = Non adopter, 1= Adopter
2. Simplicity	SIMP	Likert Scale proxies
3. Traibility	TRAIB	Likert Scale proxies
4. Usefulness	USEFUL	Likert Scale proxies
5. Compatibility	COMPAT	Likert Scale proxies
6. Observability	OBSRV	Likert Scale proxies
7. Word of Mouth	WM	Likert Scale proxies
8. Mass Media	MM	Likert Scale proxies

Source: Own Construct

Binary logistic regression model is used to test the hypotheses of the effect of the seven independent variables identified above on customers’ adoptions of online payments. Binary Logit model is selected for this study because; the dependent variable “Adoption of online payment” is discreet in nature and has two values (Adopter/Non adopter). The function that connects the dependent variable and the independent variables is presented as follows.

$$AOP = f(COMPL, TRAIB, USEFUL, COMPAT, OBSRV, WM, MM)$$

The logit model to be used in the study can be written as shown below (Gujirati, 2003).

$$Z_i = \beta_0 + \sum_{j=1}^n \beta_j x_i + U_i$$

Where Z_i is the dependent variable with a value “0” when firm i have not paid online and “1” when firm i have made online payment at least once, x_i is a vector of explanatory variables and U_i is the discrepancy term.

Using the seven independent variables and the general binary logit model presented above, the following regression equation was formulated in order to identify significant factors affecting adoption of online payment methods.

$$Li = \beta_0 + \beta_1 SIMPL + \beta_2 TRAIB + \beta_3 USEFUL + \beta_4 COMPAT + \beta_5 OBSRV + \beta_6 WM + \beta_7 MM + ui$$

Where:

L_i = log of the odds ratio of adoption of online payment to not adopting online payment

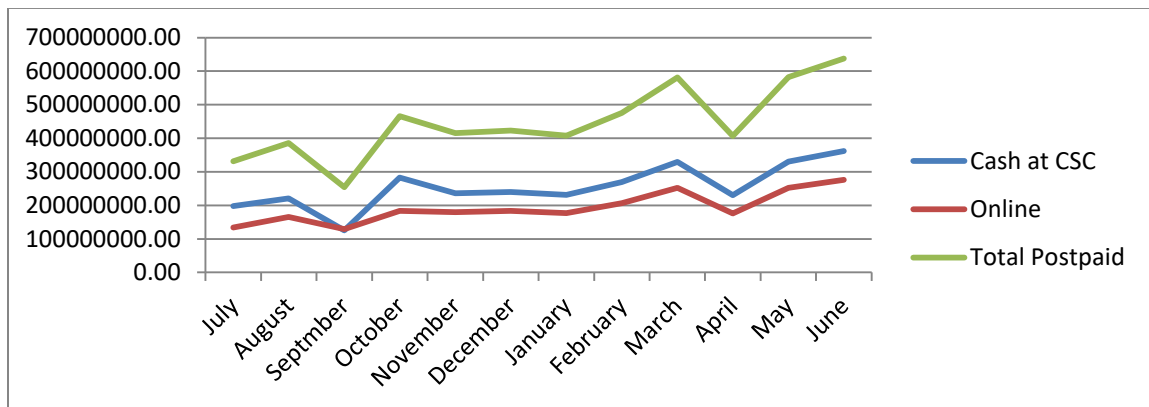
β_0 = the intercept of the regression equation

β_i = the coefficients of each independent variables

u_i = the error term

6. RESULT AND DISCUSSION

There are several methods of paying electric bill to EEU. Some of them are traditional cash based methods and others are online payment methods such as the use of CBE birr, mobile banking and telebirr. Customers can pay their bills either on cash bases at customer service centers or bank branch and online using CBE birr, mobile banking and telebirr. The trend of number of customers who pay in either of the two methods in the 2021/22 fiscal year (July 2013EC to June 2014EC) is summarized in the line graph for the past 12 months as shown below.

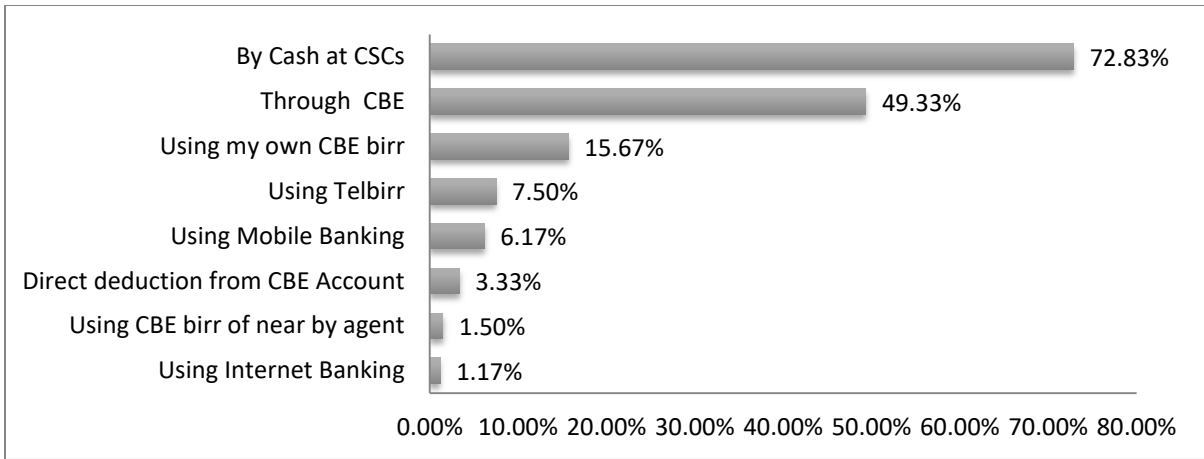


Source: EEU-AA region, 2023

Figure 2: Trend of bill collection by payment methods

As can be seen from figure 2 above, the total collection tends to increase except in the month of September and April. Further, amount of bill collection using cash is greater than the amount of bill collected through online methods. This implies customers of EEU prefer the traditional cash based methods to pay their bill instead of the online methods. Finally, the amount collected through cash based methods and online methods tend to fluctuate together except in the month of September.

As it was stated in the methodology part, the sample sizes for this study were 624 respondents selected from the four districts of EEU, Addis Ababa region. However, only 600 usable questionnaires (150 from each of the four districts) were collected back giving 96% response rate. As it was discussed above, customers can pay their electric bill through eight payment mechanisms. Respondents were asked to mention how they have been paying electric bill in the last one year and the result is summarized in the figure below.



Source: Survey data, 2022

Figure 3: Methods of Paying Electric bill

As can be seen from figure 3 above, the majority of the respondents pay their bill by cash at customer service centers or through bank branch. Only limited number of respondents tends to pay online through CBE berr, mobile banking, teleberr and internet banking. From this one can deduce that, though online bill payment mechanisms were introduced by EEU to create additional payment outlets, still the majority of the customers continued paying their bill over the counter at customer service centers or bank branches. Similar finding was obtained in the customer service satisfaction survey conducted recently by Walta (2021). In the study carried out throughout the country, it was found that about 64% and 36.5% of customers pay their bill at EEU customer service centers and bank branches respectively in person (Walta, 2021). This finding is also in line with the study by Abebe and Lessa (2020) who found that there is still poor online payment practice in Ethiopia.

The factors that affect adoption of online payment are generally categorized in to two groups. The first group consists of socioeconomic factors such as: gender, age, employment status, type of customer, education level, monthly bill amount and distance from CSCs or bank branches. The chi-square test for independence was used to determine whether two categorical variables are related. The following table 2 shows the association between socioeconomic factors and methods of payment using chi-square.

Table 2: Association between demographic & economic factors and methods of payment

		Methods of Payment			Chi-Square & Significance level
		Cash Based	Online	Total	
1. Types of Customers	Institutions	69	33	102	$\chi^2 = 4.165$ Sig. level = 0.041
	Households	387	111	498	
	Total	456	144	600	
2. Payers' Sex	Female	193	39	232	$\chi^2 = 10.087$ Sig. level =
	Male	263	105	368	

Total		456	144	600	0.001
3. Payers' Age	40 years and below	206	90	296	$\chi^2 = 12.457$ Sig. level = 0.000
	Above 40 years	250	54	354	
Total		456	144	600	
4. Education level	Masters & Above	6	16	22	$\chi^2 = 128.422$ Sig. level = 0.000
	Degree & Diploma	132	95	227	
	Secondary & below	318	33	351	
Total		456	144	600	
5. Employment Status	Not employed	285	37	322	$\chi^2 = 59.622$ Sig. level = 0.000
	Employed	171	107	278	
Total		456	144	600	
6. Monthly Electric bill	Below Average	259	96	457	$\chi^2 = 6.282$ Sig. level = 0.012
	Above Average	97	48	143	
Total		456	144	600	
7. Distance from CSCs	Below Average	316	81	397	$\chi^2 = 7.751$ Sig. level = 0.005
	Above average	140	63	203	
Total		456	144	600	

Source: survey, 2022

Before interpreting chi-square results, we need to check assumptions of chi-square concerning the 'minimum expected cell frequency', which should be 5 or greater (Pallent, 2005). From the table above, all variables have the expected frequency greater than five which indicates that we have not violated the assumption. Further, if we have a 2 by 2 table, then Pallent (2005) further suggest the use of Yates' Continuity Correction instead of Pearson chi-square. Therefore, Yates' Continuity Correction was used to see the association between variables.

From the table above, one can see that for type of customers, the χ^2 is 4.165 with significance level less than 0.05. This indicates that the proportion of organization that pays their electric bill online is significantly different from the proportion of households that use online payment. In short, organizations tend to use online payment systems as compared to their household counterpart.

In connection to gender, the χ^2 is 10.087 with significance level less than 0.01. This vivid that the percentage of males that pay their electric bill online is different from the percentage of females that adopt online payment methods. In short, males tend to use online payment systems more as compared to their females counterpart.

With respect to age, the χ^2 is 12.457 with significance level less than 0.000. This implies that, the proportion of young respondents that pay their electric bill online is significantly different from the percentage of relatively old customers that use online payment methods. In short, young respondents tend to use online payment systems more as compared to their old counterpart. From

this, one can conclude that, respondents' age affects the adoption of online payment methods. Relatively young individual can easily understand new innovations compared to their older counterpart. Hence young customers will undertake their payment online through computers or mobile phones. Similar to this, Venketash, et al. (2003) found that age will have significant effect on the adoption of online payment systems.

Education wise, the χ^2 is 128.422 with significance level less than 0.000. This implies that the proportion of highly educated respondents that pay their electric bill online is significantly different from the proportion of less educated respondents that use online payment. Understanding and using recent development requires education and training. Specifically, adoption of online bill payment involves several steps to be followed which requires reading and writing skills. In online systems, customers are required to follow series of procedures to make the online bill payment. Therefore, some sort of education is required and education level is believed to positively affect adoption of online bill payment.

In terms of employment status, the χ^2 is 59.622 with significance level less than 0.000. This implies that the proportion of employed respondents that pay their electric bill online is significantly different from the proportion of unemployed respondents that use online payment. From this, one can deduce employment status is one of the factors that are believed to affect adoption of online bill payment. This is because those working on a full time basis place a higher value on the opportunity of online bill payment. In this connection, Hope et al. (2011) found that there is positive association between online bill payment and employment status. This supports the finding that time-savings are a key reason for adoption of online bill payment

From the table 2 above, we can see that χ^2 for amount of average monthly electric bill is 6.282 with significance level of less than 0.05. This implies that the proportion of respondents with above average monthly payment that tend to pay their electric bill online is significantly different from the proportion of respondents with below average monthly payment that use online payment. In short, higher monthly electric payment is significantly associated to online payment.

Finally, we can see that χ^2 for distance from customer service centers is 7.751 with significance level less 0.01. This implies that the proportion of respondents with above average distance that pay their electric bill online is significantly different from the proportion of respondents with below average distance payment that use online payment. In short, long distance is significantly associated to online payment.

The second groups of factors that affect the choice of online payment system are the one identified by Rogers (1983) under his Innovation Diffusion Theory. Specifically, the dependent variable in this study is "adoption of online bill payment" which involves the use of e-payment methods through smart phone or computers. The five variables in the Roger's (1983) Innovation Diffusion Theory (IDT) and additional two diffusion communication related factors were assumed to affect adoption of e-payment for electric bill payment in Ethiopia.

As it was explained in the methodology section, binary logistic regression was used to identify the determinant factors that affect adoption of online bill payment. Although binary logistic regression does not have strict requirement as compared to multiple regression, one has to check

the adequacy of sample size and absence of multicollinearity problem among independent variables.

With respect to sample size requirement, Pallent (2005) advise to have 15 observations per each independent variable. Per this guideline, we need to have a minimum of 105 observations for the seven independent variables we are using. The 600 observation made in this study is well above the minimum requirement suggested by Pallent (2005).

In order to check existence of multicollinearity among the 7 independent variables, correlation coefficients among the variables were calculated. According to Pallant (2005), multicollinearity exists when the independent variables are highly correlated ($r = 0.9$ and above). The result of the correlation analysis showed that compatibility and observability are strongly correlated ($r > 0.9$) with the other variables such as simplicity, usefulness, word of mouth and mass media. Tabachnick and Fidell (2001, p. 84) suggest omitting one or more of the variables that are highly correlated with other variables from the regression model as one option during multicollinearity problem. As a result, Compatibility and Observability were excluded from the binary logistic regression and only the remaining five variables were retained.

Once the assumptions were tested and corrective action were made as shown above, binary logistic regression analysis was used to identify which of the independent variables significantly determine adoption of online bill payment. The Omnibus Tests of Model Coefficients shows how well the model performs as compared to when none of the independent variables are entered. The omnibus test of the model coefficient for this specific study is given in table 3 below.

Table 3: Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	443.720	5	.000
	Block	443.720	5	.000
	Model	443.720	5	.000

Table 3 indicates that when the 5 independent variables are used all together, they significantly predict whether or not a firm can adopt online bill payment at $\chi^2 = 443.720$, $df = 5$, $N = 600$, $P = .000$. In addition, the overall model summary for the binary logistic regression is given in table 4 below.

Table4: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	217.576 ^a	.523	.783

From the above table 4, it can be seen that the 5 variables together can predict 52% to 78% of the variation in the adoption of online electric bill payment. The remaining 22% - 48% of the variation are explained by some other factors not included in the binary logistic regression equation. This is very much similar with Rogers (1983) argument that the five attributes alone have been found to determine above half of the variance of adoption rates. The effect of the specific factors on adoption of online payment is presented in table 5 below.

Table 5: Binary Logistic Regression Result

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1 ^a	Simplicity	1.351	.243	30.824	1	.000	3.859
	Triability	-.072	.178	.162	1	.687	.931
	Usefulness	-.452	.269	2.823	1	.093	.636
	Word-of-mouth	.262	.215	1.478	1	.224	1.299
	Mass Media	.332	.187	3.162	1	.075	1.394
	Constant	-4.645	1.127	17.001	1	.000	.010

From table 5 above, it can be seen that simplicity and mass media positively and significantly determine the adoption of online electric bill payment at $P < 0.1$. On the other hand, usefulness has a significant but negative effect on adoption of online payment system. The discussion associated to each this significant variable is given in the following paragraphs.

The first significant factor affecting adoption of online bill payment is simplicity. Those customers who perceive online payment systems are simple tend to adopt it very quickly. The odd ratio for simplicity of 3.859 indicates that as simplicity increase by one unit, the probability of adopting will be 3.859 times more than not adopting. Empirical evidence in Ethiopia by Abebe and Lessa (2020) also indicated that simplicity is the second powerful factor affecting customers' attitudes to adopt mobile payment.

The second factor that has a significant positive influence on online bill payment is mass-media including TV, Radio and other social Medias which indicates that customers who use online payment systems obtained the information from mass-media. The odd ratio for mass-media of 1.394 indicates that the probability of adopting will be 1.394 times more than not adopting. In line with this, previous study by Zolait & Ainin, (2008) found that mass media channels were more effective in creating knowledge of innovations.

Usefulness is the third factor affecting adoption of online bill payment but negatively. Theoretically, customers who realized the usefulness of online bill payment tend to adopt it more quickly. But the finding of this study contradicts this theoretical view. That is, customers are not using online payment method because of its relative advantage rather it is because of some other reason. The main reason might be because some customers are not satisfied with the online payment system of EEU at the moment. There are customers who complain double payment or cutting of electric line since the amount paid online was not accepted by some meter reader. Further, other customers have complained that they are forced to go to customer service centers after making payment online for checking purpose. As a result of this kind of problems, some customers are now shifting to the traditional cash based payment. These instances showed that customers are wasting resources and time because of attempting to make payment online and paying online may not have relative advantage and rather a disadvantage.

Two variables including trialability and word of mouth were not found to be significantly affecting adoption of online bill payment and the other two variables including compatibility and observability were not included in the regression because of multicollinearity problem.

8. CONCLUSIONS AND RECOMMENDATIONS

The finding of the study showed that the majority of the respondents pay their bill physically by cash at customer service centers or bank branches. Only a quarter of the respondents tend to pay online through CBE birr, mobile banking, telebirr and internet banking. Even, those who started e-payment also complain: interruption of internet connection; the online system not working properly and unavailability of CBE birr agent in a nearby destination. This is partly as a result of the limited access to quicker and easier, compatible and integrated payment solutions with existing infrastructure, reliable, secure and trusted services. This implies, the adoption of online payment systems is still at initial stage even in the capital city Addis Ababa and customers spend their valuable time traveling and queuing to pay electric bill.

The study found that online payment is strongly associated with the age, gender, employment status, educational level, type of customer, amount of bill and distance from customer service centers. The study also found that simplicity, usefulness and mass-media significantly determine the adoption of online electric bill payment. This implies that Rogers' Innovation Diffusion Theory formulated in developed countries is also important in providing practical implications and analytical guidelines for research on innovation adoption in developing country like ours. Further, it implies that EEU should take in to account the above identified factors while designing and promoting online bill payment methods that are effective in enhancing customers' service provision.

EEU and its partners including Commercial Bank of Ethiopia and Ethio telecom should take appropriate measure to overcome the above mentioned obstacles and increase the number of customers paying their bill online. First, the online system developed should be further simplified. Second, greater emphasis on marketing of the online payment option will increase awareness and allow customers to actively make it a choice of the day. This can be made by promoting the online payment system through TV, radio and other social media. At the moment, EEU is promoting its service through its own Facebook address and through Fana TV and this has to be further extended through other media outlets also. Finally, customers should also need to try out online payment in the evening when the network connection is relatively free.

REFERENCES

- Abebe, F. and Lessa, L. (2020). Factors Affecting Mobile Payment Adoption By Merchants In Ethiopia. African Conference on Information Systems and Technology. 13.
<https://digitalcommons.kennesaw.edu/acist/2020>
- Aman G. (2016). Assessment of the Practices, Challenges and Prospects in implementation of Organizational Change: the Case of Splitting Ethiopian Electric Power Corporation. MBA Thesis, Indira - Gandhi National Open University
- Banerjee, A., & Fudenberg, D. (2004). Word-of-mouth learning. *Games and Economic Behavior*, 46(1), 1–22
- Chung, W. and Paynter, J. (2002). An Evaluation of Internet Banking in New Zealand, IEEE Proceedings of the 35th Hawaii International Conference on System Sciences – HICSS, IEEE, Conference on 7-10 Jan 2002, PP. 2410 – 2419
- Ethiopian Electric Utility (EEU) (2022). Organizational Profile, accessed from <http://www.eeu.gov.et/>

- Ethiopian News Agency (2018), Thursday, May 31, 2018
- Fikere, Z. (2010) Service Delivery and Customer Satisfaction: A case study on Ethiopian Electric Power Corporation, East Addis Ababa Region, Customer Service Center.
- Floh, A. and Treiblmaier, H. (2006). What Keeps The E-Banking Customer Loyal? Multi group Analysis of the Moderating Role of Consumer Characteristics on E-Loyalty in the Financial Service Industry, *Journal of Electronic Commerce Research* , Vol. 7, No.2, pp 97-110.
- Gujarati, D.N. (2003). *Basic econometrics* (4th ed.). USA, McGraw-Hill
- Hope, R.A., Foster, T., Krolkowski, A. and Cohen, I. (2011) Mobile Water Payment Innovations in Urban Africa. December 2011, School of Geography and the Environment and Skoll Centre for Social Entrepreneurship at Saïd Business School, Oxford University, UK.
- Khalifa, M. and Cheng, S. (2002). Adoption of Mobile Commerce: Role of Exposure, *Proceedings of the 35th Hawaii International Conference on System Sciences – 2002*, [Online] Available: <http://www.hicss.hawaii.edu>
- Lichtenstein, S. & Williamson, K. (2006). Consumer Adoption of Internet Banking: Understanding Consumer Adoption of Internet Banking An interpretive study in the Australian Banking context, *Journal of Electronic Commerce Research*, Vol. 7, No.2, pp.50-66
- Pallant, J. (2005). *SPSS Survival manual: A step by step guide to data analysis using SPSS for window (Version 12)*. Australia, Allen &Unwin.
- Rogers, E (1983), ‘Diffusion of Innovations ’, 5th Edition, Simon & Schuster, Inc., New York,
- Sarel, D. and Marmorstein, H. (2003). Marketing Online Banking Services: The Voice of the Customer, *Journal of Financial Services Marketing* , Vol. 8, No. 2, pp.106–118.
- Stevens, J. (1996). *Applied multivariate statistics for the social science* (3rd ed.). USA, Lawrence Erlbaum
- Tabachnick, B.G., &Fidell, L.S. (2007). *Using multivariate statistics*. USA: Pearson Education, Inc.
- Tan, M. and Teo, T. S. H. (2000). Factors Influencing the Adoption of Internet Banking, *Journal for association of information system*
- Teklehaimanot S. (2007). Evaluation of the Design and Implementation Of decentralized Billing System Project and Its Impact on Change Management Process. A Case Study Of EEPCO. MBA Thesis, Addis Ababa University, Ethiopia.
- Walta Media and Communication Center (2021) Ethiopian Electric Utility Customer Satisfaction Survey
- Widayat W., Masudin, L. and Satiti, N.R. (2020). E-Money Payment: Customers’ Adopting Factors and the Implication for Open Innovation, *Journal of open Innovation, Technology, market and Complexity*.
- Yamane, Taro. (1967). *Statistics: An Introductory Analysis*, 2nd Edition, New York: Harper and Row.
- Zolait A.H.S. & Sulaiman A. (2008). Incorporating the Innovation Attributes Introduced By Rogers Theory in to Theory of Reasoned action: An examination of Internet Banking adoption in Yeman: *Computer and Information Science* Vol. I No. I Accessed at WWW.ccsenet.org/journal.htm.

Acknowledgment

This Research was sponsored by Ethiopian Civil Service University.