OBSTRUCTIONS IN ELECTRIC BILL PAYMENT: The Case of Ethiopian Electric Utility Jimma District

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfilment of the Requirements for the Award of the Master of Science in Accounting and Finance (M.Sc.)

BY:

BELAY WUBE

JIMMA UNIVERSITY

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Under the Guidance of

Dr. Deresse Mersha (Asso. prof.)

And

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CERTIFICATE

This is to certify that the thesis entitles "Obstructions in Electric Bill Payment: The case of Ethiopian Electric Utility Jimma District", submitted to Jimma University for the award of the degree of Master of Science in Accounting and Finance (M.Sc.) and is a record of bonafide research work carried out by Mr. Belay Wube Tesfaye, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institution for the award of any degree or diploma.

Main Advisor's Name	Date	Signature
Dr. Deresse Mersha	_____	_____
Co-Advisor's Name	Date	Signature
Mr Abebe Shentema	_____	_____

DECLARATION

I hereby declare that this thesis entitled "Obstructions in Electric Bill Payment: The case of Ethiopian Electric Utility Jimma District", has been carried out by me under the guidance and supervision of Dr. Deresse Mersha (Asso. prof.) and Mr Abebe Shentema (M.Sc.).

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institution.

Researcher's Name	Date	Signature
BELAY WUBE TESFAYE	_____	_____

ABSTRACT

In spite of the low-cost recovery levels of the utility companies in developing countries, consumers often faced with the problem of inaccuracy and delay in monthly billing due to the drawback in reading pattern and human errors, and the problem is more sever in conventional billing and metering systems. However, digital payment systems have believed to solve problems associated with conventional method of bill payment there are still complaints from EEU customers. The purpose of this study is to identify obstructions of electric bill payments in EEU Jimma district, Agaro and Sokoru town customer service centers (CSCs). Both qualitative and quantitative research approaches were used. In this study, 238 sample respondents were selected from two CSCs in Agaro and Sokoru town. An interview questionnaire was used to collect their opinion. The data were analysed using SPSS version 20. The descriptive result of the study shows the majority of customers pay their electric bill on a cash basis, meter reader read meter irregularly and customers wait for a long times to pay their electric bill at CSCs. The findings of binary logistic regression further revealed that employment status, simplicity, compatibility, and relative advantages have a positive and significant effect on the adoption of online electric bill payment while trialability, observability, customer type, income and educational level were found to be insignificant in this study. In addition to this age has a negative and significant relationship with the adoption of online electric bill payments. Finally, feasible recommendation has been made on identified challenges regarding electric bill payment.

***Keywords**: Challenges, Electric bill, Adoption, Online bill payment, DOI Theory*

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LIST OF ACRONYMS

ATM =	Automatic Teller Machine
CBE =	Commercial Bank of Ethiopia
CIBS =	Customer Information and Billing System
CMS =	Customers' Management System
CSCS =	Customer Service Centres
DDSI =	Direct Debit Standing Instruction
DOI =	Diffusion of Innovation
E Or e =	Electronic (As in e-Bill, e-Commerce, E-Banking, E-Payment, E-Wallet)
EBPP =	Electronic Bill Presentment and Payment
EELPA =	Ethiopia Electric Light and Power Authority
EEP =	Ethiopia Electric Power
EEPCO =	Ethiopian Electrical Power Corporation
EEU =	Ethiopian Electric Utility
KWH =	Kilo-Watt-Hour
M-BIRR =	Mobile Birr
SDG =	Sustainable Development Goals
SPSS =	Statistical Package for Social Sciences
TAM =	Technology Acceptance Model
TPB =	Theory of Planned Behaviour
TRA =	Theory of Reasoned Action
UTAUT =	Unified Theory on Acceptance and Use of Technology

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CHAPTER ONE

1. INTRODUCTION

This chapter begins by presenting brief background of the study and EEU, which is followed by the statement of the problem. Under the statement of the problem, the study states the reasons to carry out this study. Following the statement of the problem, the general and specific objectives of the study are presented. After that, the next section presents significance, scope, limitation and organization of the study.

1.1. Background of the study

Today, electricity is not limited to providing light at home and energy for electronic devices at home or office used to perform a multitude of tasks, but it is also the main source of energy for commercial and industrial establishments (Bharadwaj & Baruah, 2018). Thus, electricity has become crucial to everyday activities of human being since it affects their quality of life and economic performance. Among the core component of the seventeen Sustainable Development Goals (SDGs) which were adopted on September 25, 2015 by the 194 member states of the United Nations is the seventh goal, which focused on access to energy. The first target of SDG-7 aims to ensure access to affordable, reliable and sustainable modern energy for all (Telles & Waldron, 2017). However, a number of studies (Avila et al., 2017; Tigabu, 2018; Gollwitzer et al., 2018; Hojčková et al., 2018; Juju et al., 2020; Entele, 2020) confirm the fact that sufficient and reliable supply of electricity is far from a reality in developing countries, and this is especially a problem in Sub-Saharan Africa. In order to assure efficient and reliable electric power supply, availability of a reasonably priced and reliable source of finance is a mandatory requirement.

The vast majority of people living without any access to electricity are located in sub-Saharan Africa, which accounts for 55 percent of all people globally without electricity access, and Asia, which accounts for 40 percent (Telles & Waldron, 2017). In sub-Saharan Africa, six countries (Nigeria, Ethiopia, DRC, Tanzania, Uganda, and Kenya) had a collective 313 million people living without electricity as of 2014; 30 percent of the global total and half of Africa's deficit. Amongst the major barriers to expanding energy access is utility provider's low cost recovery performance (i.e., service provider's ability to recover payment, within a reasonable timeframe, for all the bills sent to customers), which may

decreases the utility's revenue and cash flows, in turn, it has impacts on the ability to cover operating expenses and extend service coverage. Therefore, it is clear that electricity utility providers should have to maintain constant cash flows through sustained and improved bill presentment and payment.

Vllasaliu (2015) summarized the multitude consequence of customer's non-payment of electric bill in to three dimensions: first unpaid bills decrease revenues for utility providers, which mean that there is less money to purchase electricity, and make improvements in service; secondly unpaid bills contribute to higher prices for paying consumers, as non-payments are calculated into the price of electricity. Third, non-payments may add additional pressures on the social funds available to low-income consumers. Thus, reliable and efficient Customer Information and Billing System (CIBS) are crucial for the efficient commercial operation of a power utility. It is an important tool for ensuring proper revenue generation and timely revenue collection. The CIBS is also the interface with the customers and can be used to provide improved customer service such as correct and reliable billing information (Teklehaimanot, 2007).

Although various factors may influencing consumer bill payment behaviour utility providers efficiency in metering and billing have a significant contribution. An effective method of metering, billing and payment system stimulates and compels electricity consumers to pay their bills on time (Effah et al., 2014). In spite of the low-cost recovery levels of the utility companies in developing countries, consumers often faced with the problem of inaccuracy and delay in monthly billing due to the drawback in reading pattern and human errors, and the problem is more sever in conventional billing and metering systems.

In conventional metering system, customers normally pay their electric consumption at the end of every month after following the lengthy process of bill preparation. That involves manual meter readings, feeding the collected readings in to a computer at every CSC and /or districts, depending on the access to CMS and the number of customers, and finally preparing it all for data processing at a centralized data (bill) processing unit, which is found at the headquarter. Once the bills are ready for sell, they will be dispatched to CSCs, districts and Regional Offices, where then customers would pay for their regular consumptions at a predefined dates. This long process of bill preparation has been costly both for the corporation and more importantly for its customers as it involves a number of

human and non-human errors. Such as inaccurate meter readings, inputting errors, and preparation of wrong billing amounts, delays in bill preparation, swapping customers' bills, which result in unusually high or low bill amount than their actual consumptions, right from the collection of readings up to the sales of the bills (Akele, 2012). The problems will more sever when the conventional method of bill payment (traditional cash basis) is the only alternative available for customers to pay their bills. Thus, to overcome these challenges utility providers should have to support the metering and billing system through innovative technology.

To address this problem, utility companies are resorted to finding effective ways to both provide improved customer service, as well as reducing their costs. One-way of doing this is with Electronic Bill Presentment and Payment (EBPP). The on-line bill provides an opportunity for the company (the biller) to replace the expensive, static paper-based bill with a personalized, rich transactive presentment of the bill along with highly targeted cross-sell marketing and customer self-service access that also can significantly reduce billing costs and customer service/support costs (Netscape Communications, n.d.).

The rapid improvement in technology are creating the opportunity to pay bills through online, in which bills are created, processed, delivered, and paid electronically over the Internet. Online bill payment provide customers convenience while eliminating costs in terms of travel and time required to make payments, late fees and high tariff due to meter reading errors and delays, and waiting long queues. Thus, online bill payment can reduce utility's billing related operational costs, non-payment of bills and customer service complaints because of improved services delivery.

In addition to the problems of inaccuracy and delay in monthly billing due to the drawback in reading pattern and human errors, the growing number of people who has increasingly pressured for time; online utility bill payment has become a graceful solution for the electricity consumers with busy life styles. Through online payment of utility bills, consumers are able to save time, hassle and therefore make their lives much easier(UK Essay, 2017).

According to Telles & Waldron (2017), digital payments represent a major opportunity for utilities and mini-grids to realize cost savings by reducing expenses in metering, credit operations, disconnections, reconnections, transporting cash, leakages, and through better monitoring of electricity consumption. Digital payments also enable, allowing utilities to

shift customers to smart, prepaid metering systems, where a customer purchases a set amount of kilowatt-hours (KWH) prior to consuming them, with tamper-proof meters reducing the risk of energy theft. They also state that utilities often fail to leverage these efficiencies: In the 2014 Global Findex survey, 79 percent of adults who had made a utility payment in the past year had paid in cash. For low- and middle-income countries, it was even higher at 93 percent.

1.2. Background of Ethiopian Electric Utility

Electric power first introduced in Ethiopia by the late 19th century during the regime of Minilik by installing the first diesel generator in the palace. In addition to the use of generators, Minilik constructed the first Hydro Power Plant on Akaki River in the year 1912 in order to supply power to small factories, to the palace and to give light to a major road near the palace (Girma, 2020).

According to Teklehaimanot (2007), the government effort to extend power supply to the public was hindered by the Italian invasion of Ethiopia in the years 1936. During this temporary occupation, the Italian company called Coneil overtook the generation and distribution of electric power. The company installed generators at different places and extended the power supply to the then major towns.

After the Italians were driven out from Ethiopia in the year 1941, an organization called Enemy property Administration was established and took over along with other activities the generation and distribution of power to the public. In the year 1948, an organization that had been vested with the power to administer the enemy property was evolved to the first electric power utility called Shewa Electric Power. Later on in the year 1955 in light of its function, Shewa Electric power name was changed to "Ethiopian Electric light and Power". Soon after its establishment, the supervision and management of the organization was vested in the Board of Directors appointed by the government. Then in the year 1955, Ethiopian Electric light and Power after eight months of establishment was transformed to the Ethiopia Electric Light and Power Authority (EELPA) (Teklehaimanot, 2007).

The newly established, EELPA was organized as vertically integrated monopoly with a generation capacity of 35 GWH while the number of customers was 12,500 and led by Board of Director appointed by government to engage in the business of generation, transmission, distribution and sale of electric energy to the public (Girma, 2020).

In order to accommodate the new change in the power sector environment around the world, the power sector reform, which was initiated by world bank have been implemented in 1997 by transforming and renaming EELPA into the Ethiopian Electric Power Corporation (EEPCO) by reorganizing its function on the basis of the principle of commercialization and decentralization (Girma, 2020). Accordingly, the EEPCO as public enterprise was established for indefinite duration by regulation No. 18/1997, and conferred with the powers and duties of the previous EELPA.

In 2013 the EEPCO split into two separate utility namely Ethiopia electric power (EEP) which is responsible to Generation and transmission and Ethiopia Electric Utility (EEU) which is mandated to take care of distribution and sell of electricity; by Councils of Ministers Regulation No 302/2013 and 303/2013 respectively (Mengistu, 2017).

From the above overviews of historical development of electricity in Ethiopia and various organizational structures designed to perform the generation, transmission, distribution and sell functions; thus it is clear that currently mandated tasks of EEU were performed by all of those organizations under the respective functional unit or department. Thus, the present EEU has passed through different organizational and operational structures, and it has undergone various transformations and strategic measures such as via Customers' Management System (CMS), decentralization of Accounting and Billing system from once highly centralized down to the regional distribution offices, districts, and Customer Service Centres (CSCs) and Prepayment (Metering) System while it was under the EEPCO.

Ethiopia's state-owned power company, EEU provides electricity to about three million customers across the country with the ultimate goal of extending electricity service to all citizens (Hizkel, 2019). To achieve its vision of providing the World Class services, EEU has undertaken an exercise to redefine the way business is done by creating a framework of new organizational structure and business processes. Accordingly, EEU has introduced organizational and operational changes in order to rectify the electricity provision problem witnessed across the country. Among the major strategic issues of the change are decentralization, process automation and outsourcing (Curated Content, 2018).

As part of decentralizing CMS, the EEU structured in 11 Regions, 28 Districts, and 560 Customer service center. Getahun Mekuria, EEU Board Chairman said that "the reorganization will save time and help resolve problems promptly as they operate in close proximity and it will also create opportunity to check accountability with regional states

and administrations, and work closely to solve problems related to rehabilitation programs of power distribution" (Curated Content, 2018). Sileshi Bekele, Minister of Water, Electricity and Irrigation said that, "modernizing electric utility and supporting it with advanced technology is critical to reduce mismanagement of resource, customer management, and proper collection of electric service bills" (Curated Content, 2018). In line with this, EEU has implementing an Enterprise Resource Planning (ERP) it is an enterprise-wide information system that facilitates the flow of information and coordinates all resources and activities within the business organization; and various types of payment systems in order to provide its' consumers with a wider choice to make their bill payment. Currently payment of electricity bills in Ethiopia can be done through payment centers (consumers visit the payment office), bank, mobile money services, and ATM/POS.

Too more recently the EEU has also automating its mater reading process through the application of an Automatic Meter Reader (AMR) it can generates more timely and accurate bills, while eliminating the need for manual truck rolls, labour to read meters, connect/disconnect service and malpractices or errors.

The ultimate goal of EEU, and the Government of Ethiopia, is to extend electricity service to all citizens. However, there are challenges to making this goal a reality, EEU faces a very difficult operating environment (Hizkel, 2019). Since, electricity companies are businesses with significant credit sales timely collection of payments from the customers and balancing cash flows are essential prerequisites for its liquidity and future growth potential, however as reported by (Hizkel, 2019) the EEU is subject to fluctuations that may hamper its operations. The utility purchases the energy it distributes from EEPCO, largely with funds that it collects from its customers on a monthly basis. If collections fall short—because customers are either unable or unwilling to pay for the electricity they use—then EEU incurs deficits. As of 2019, EEU estimates that these deficits amount to close to $100 million per year; this may further delaying grid development and services to the remaining unconnected Ethiopian consumers (Hizkel, 2019).

EEU's most recent challenge has been the severe impact of COVID-19 on the utility's revenue and delivery of service. The country's partial lockdown and scaling down of economic and social activities has reduced demand for electricity. This potential loss of revenue could impact the ability of EEU to service existing debt and meet required

operations budgets, thus constraining the quality and the extent of the services it provides (Hizkel, 2019).

In general major strategic measures and process automation projects were expected to solve customers complaint and maximize EEU's ability to service its customers through accurate meter reading and reading cycle management, improved billing efficiency and accuracy, enabling customers to access their account information and make payments through multiple channels, improved revenue realization, customer centric contact center and higher customer satisfaction. However, there are still complaints from customers related to EEU metering and billing activities.

On the other hand, customers' uptake of those newly introduced innovative products of EEU is also very low. For instance, according to Akele (2012), after 7 years of project life it was only less than 5% of its total customers were actually started to use the prepayment service. They also state that, the prepayment system has been receiving a continued resistance from the customers even if the corporation keeps on using different promotional tools and marketing strategies in order to increase the number of (early) adopters. Such as providing the meter and its accessories free of charge for those wishing to change the older meter, as well as retain those who have tried the new service through better management of its relationship with existing customers.

After the unsuccessful implementation of prepayment meter over the years, EEU endure its investments in automating the metering and billing process and now embracing an advanced metering infrastructure known as Automatic Meter Reader (AMR), and the company launched the online billing system. Although online utility bill payment has become one of the fastest growing trends in the world particularly in developed countries however in Ethiopia the progress of consumers' adoption rate remain low and has been getting a continued confrontation from customers of EEU. This indicates that there is something wrong that the company needs to address to increase customers' uptake of online electric bill payment methods and thereby to get its potential benefit of resolving persistent customer complaints in its billing system and improved revenue realization. These and other challenges in the company's billing system prompted the researcher to assess challenges of electric utility bill payment in EEU Jimma district Agaro and Sokoru town CSCs.

1.3. Statement of the problem

Nowadays the improvement of e-commerce has led to the derivation of various Internet based activity; for instance, companies are able to conduct their business activities at all hours, reaching customers in all parts of the world thus expand their customer base without geographically being limited. Whereas from customers' perspective, e-commerce provides a platform on which they can easily carry out the necessary transactions at their convenience. Hence, even companies, which provide utility services, are boldly revolutionizing their industry by adopting e-commerce for bill collection purposes. This allows customers to make their utility bill payments directly through utility companies' websites or through a third party website such as banks, financial institutions and aggregators (UK Essay, 2017).

Online utility bill payment is when; the customer makes his or her payment transactions online for the utility services obtained from a particular company. By paying utility bills via online, consumers have the benefits of avoiding crowds, queuing, parking problems, and cutting their travelling costs and time (Ramayah et al., 2005). Hence, consumers could simply get their utility bills paid with just a click of their mouse. It provides an environment to maintain the consumer details starting from receiving bill, making bill payments and so on. Consumers can lodge complaint and make their bill payments just by logging into the system (Okorie et al., 2019). However, People carry out transactions by using physical money in the form of coins and bills for so long and still significantly rely on it throughout the globe and still more within the developing countries (Abebe & Lessa, 2020).

According to Nchoe (2009), online billing is means to achieve timely and efficient bill collection and avoiding customer queuing has to pay bill in bank and CSCs by enabling the customers to query and pay their bill balances using mobile phone and receive other services through the SMS and e-mail. In line with this to improve its operating efficiency, revenue collection, customer billing system and customer satisfaction and to resolve persistent customer compliant, EEU has implemented online billing system. Although, various benefits offered through online utility bill payment this development is not well experienced in Ethiopia.

According to Demirguc-Kunt et al. (2018), in 2017 out of total utility bills paying Ethiopian customers, 99 per cent paid using cash only, whereas the corresponding figure

was only twelve per cent in Kenya, twenty-seven per cent in Tanzania, and fifty-nine per cent in Sub-Saharan Africa on average. At the same time, out of total Ethiopian wage recipients, only zero point two per cent received through a mobile phone, compared to thirty-seven per cent in Kenya, twenty-four per cent in Tanzania, and nineteen per cent in Sub-Saharan Africa on average. Even though customers somehow benefited from the rapid climb in electronic commerce and use of mobile devices in electronic commerce, they are still hesitate to effectively employ in their day-to-day transactions and there is still a poor cashless payment mechanism in Ethiopia especially among people in rural areas and young people without a bank account (Abebe & Lessa, 2020).

Despite the fact that EEU has introduced a new payment system in order to allow clients to make their monthly electric bill payment through online method as an alternative to bank and CSCs, most of its customers are still using CSCs to pay their electric utility bill. Although, a number of research works have been carried out to examine the adoption of new payment system most of them drifted towards a specific aspect of payment system and all had differing focuses.

Moreover, since the online payment of utility bills is new to Ethiopia, no one has conducted a research on this problem. In this regard, most of the previous studies about customers' usage intention of payment method that were done in Ethiopia focused on the adoption of different payment methods in banking sector. Therefore, this study has carried out in order to fill lake of understanding as to what determine the adoption of online electric bill payment system.

On the other hand, it is common to hear that EEU customers' grievance in various public Medias with regard to its bill collection system, For instance customers usually claim that they forced to pay an exaggerated amount, not timely and accurately meter reading, and queuing for a long time at CSCs. It is also limited to get enough literature in the area of challenges in electricity bill payment; most of the studies conducted up to now concerning on service quality and customers satisfaction with the electric services rather than identifying challenges in electric bill payments. Therefore, this study has carried out in order to determine and prioritize the main problems of electric bill payment that leads to customer complaints.

Finally, although digital payment systems have believed to solve problems associated with conventional method of bill payment but there are still complaints from EEU customers.

Thus, why these complaints persist, despite the investments the company has made in this system, has created doubts as to whether there are real benefits from this approach. So far, a survey has not done to establish which benefits and challenges of online electric bill payment customers have realized and encountered. Therefore, this study has carried out to determine if there are any benefits and challenges of online electric bill payment to the customer.

Therefore, the above-stated reasons motivated the researcher to conduct this study to identify the challenges in electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs. Accordingly the study was tried to address the following basic questions:-

1. What are the practices of electric bill payments in EEU Jimma district, Agaro and Sokoru town CSCs?
2. What are the challenges in electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs?
3. What are the factors that determine the adoption of online electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs?

1.4. Objective of the study

1.4.1. General Objective

The main objective of the study was to examine the obstructions in electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs.

1.4.2. Specific Objectives

Specific objectives that derived from the general objective and addressed in this study are:

1. To examine electric bill payment practices in EEU Jimma district, Agaro and Sokoru town CSCs.
2. To assess the challenges in electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs.
3. To examine the determinant factors of adoption of online electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs.

1.5. Significance of the Study

This study intended to assess the challenges of electric utility bill payment and the factors that affect the adoption of online electric utility bill payment. The findings of this study will mainly benefit EEU to identify the challenges faced by customers while paying electric bills, to identify factors influencing consumers' intention to adopt online bill payment, and to bring out challenges experienced by customers in adopting this new technology. Therefore, by understanding such factors, EEU will be able to eliminate those problems, improve service delivery, satisfy customer needs effectively and efficiently and exerted efforts to bring tangible result by taking corrective measures.

This study will also be essential for other governmental or non-governmental utility service providers to develop enhanced strategies regarding to payment options that available to their clients. Furthermore, this study provides valuable insights to policy makers, financial institutions, online transaction facility providers and software developers in formulating appropriate strategies that appeal more customers for the adoption and use of online payment system. Finally, the information, data and results of this research can be a base for future researchers as a material to review.

1.6. Scope of the Study

This study was delimited to assessing the obstructions of electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs, and specifically, to identify the challenges faced by customers while paying electric bills, the factors influencing consumers' intention to adopt online bill payment and the benefits and challenges experienced by customers in adopting this new technology. Thus, this study is limited only to the billing system and other aspects of customer services are beyond the scope of this study.

In terms of geographic scope, the research was limited to Agaro and Sokoru town CSCs due to the resource constraints (time, finance). Furthermore, the scope of this study was limited to post-paid customers, because customers of EEU is large it is difficult to cover both post-paid and prepaid customers at this time, and also for prepaid customers the conventional method of bill payment (traditional cash basis) is the only alternative available to pay their bills

1.7. Limitation of the Study

The focus of this study was to assess the obstructions of electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs in relation to electric bill payment practices and problems in the billing system; benefits and challenges of online electric bill payment experienced by customers; and factors influencing customers' adoption of online electric bill payment methods. Owing to the initial stage of online electric bill payment services available in Ethiopia, it was very difficult to get secondary data as well as literature in this area from the country perspective.

Another limitation of the study was that some customers were unwilling to provide data relevant to the study. However, the researcher overcame this by clearly explaining to them the purpose of the study and by having letter of cooperation from the university to assure them that the response, they provided would be used for academic purposes only and thereby be treated with confidentiality.

1.8. Organization of the Study

This study is organized into five chapters. The first chapter is introduction, which consists of background of the study, background of the organization, statement of the problem, and objective of the study, significance of the study, scope and limitation of the study. The second chapter includes related literatures review; the third chapter describes the methodology used while preparing this paper. The fourth chapter is about analysis and discussion and finally chapter five comes up with the summaries and conclusions of the findings and forwards recommendations.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

This chapter deals with the literature relevant to the investigation under consideration. It has an overview of electric billing system in general and electric billing system in Ethiopia; electronic bill presentment and payment (EBPP); theoretical review; empirical review; and the conceptual framework of the study.

2.1. Electric Billing System

Since, revenue collection from electricity bill is the main sources of income in electric utility company they must focus on improving bill presentments instead of concentrating too much only on power generation and distribution in order to achieve better customers' bill payment behaviour (Sualihu & Rahman, 2014). Thus, billing is among the basic business activities of electric utility company that to be performed in revenue cycle that involve preparing and sending invoice to customer and collecting payment from customer. Usually, for electric utility company the billing system involves three basic activities. These are meter reading, bill processing and bill collection.

Electricity bill is the amount that energy suppliers charges to customers for energy consumption over the billing cycle measured in the KWH multiplied by the respective tariff range in order to recovering their costs of installation, generation, transmission and distribution. Electric billing is an information processing activity that repackages and summarizes information from the meter reading activity.

2.1.1. Type of Electric Meter

Meter means equipment used for measuring electrical quantities like energy in KWH. An electricity meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered tool (Effah et al., 2014). According to Amnie (2016) there are two broad categories of electric meters electromechanical meters and electronic (smart) meters. Further, they can be of different types such as numeric display meters, standard meters, variable rate meters, prepayment meters etc.

Electromechanical Induction Meter or Standard Meter: is the most commonly used electric meter that operates by counting the revolutions of an aluminium disc. It measures the electricity in KWH but still not capable to measure new rate structure (i.e. variable

time pricing) and unable to provide awareness to users about their power consumption pattern. In traditional electromechanical induction meter or standard metering system, human labour plays a significant role in the collecting and managing field data (Yin, 2012), where the human interface-meter reader- notes the unit of electricity consumed shown on the meter and bill is imposed on the customers along with other costs (Alam & Shahriar, 2012).

Prepayment Electric Meter: it accept tokens or prepaid cards to get electricity supply. The customer has to pay the charges for the power supply in advance. One can also top-up the amount for extending the period of electric supply or when the balance over the supply automatically cut off by a relay in the electric meter (Amnie, 2016).

Electronic Meter: it based on automatic meter reading or remote meter reading technologies by using GSM, GPRS and Bluetooth to transfer the information related to power consumption; and also it can store the usage profiles and the load requirements of a consumer and process it accordingly. Electric meters also help in detecting energy theft or any attempts at meter tampering with the help of their inbuilt automatic sensors (Amnie, 2016).

Smart Meter: it is the latest in energy meter technology; instead of simply providing a total of energy consumption in your home like many conventional meters, smart meters can provide you with detailed information on how and when you used your energy. They also communicate with the electricity company, sending and receiving information so that no one need come out to read your bill and the energy supplier does not need to estimate your bill. There are many ways to get a smart meter reading. These include using a monitor, online monitoring and looking at your bills (UK Power Limited, 2012).

2.1.2. Alternative Metering and Billing Options

There are two alternative approaches in meter reading manual and automatic. In manual metering the meter reader persons goes to each meter and take the meter reading manually to issue the bill, which will later be entered in the billing software for billing and payment automation. The value of meter may not be very accurate as the meter value is entered by human and sometimes human may make mistakes when entering the meter value (Yin, 2012). Automatic meter reading is the process of automatically collecting consumption, diagnostic, and status data from water meter or energy metering devices (gas and electric)

and transferring that data to a central database for billing, troubleshooting, and analysing (Tirop & Nganga, 2018).

In conventional metering, there are three billing methods (ways of charging) electricity customers for the consumption of energy post-paid billing system, estimated billing system and prepaid billing system (Arimoro et al., 2019).

Prepaid billing is a billing technology where consumers pay for the services in advance before consumption while, post-paid billing is a billing technology where the consumers uses the services then pay for them later after readings are taken and a bill is given to the customer (Tirop & Nganga, 2018). Under estimated billing system consumers are required to pay a specified monthly amount regardless of the units of electricity consumed (Arimoro et al., 2019).

2.2. Electric Billing System in Ethiopia

Based on the type of meter, customers of EEU divided in to two categories as post-paid and prepaid and thereby EEU has two different billing methods: prepaid and post-paid billing system. EEU has introduced the prepayment system in 1999 E.C with the intension to improve the service quality of the billing system by changing the analogue post-paid meters to prepayment electrometer, which enables the firm to collect the amount ahead of consumption with hundred percent performances (Fekadu, 2018). Under this system the user purchases energy at the sales outlet and, as part of the operation, receives a credit slip and a supporting device that identifies the operation, which may be a voucher with an identification code or another with a magnetic support. The user then utilizes the device to add on her new consumption credit, either by entering a code or by inserting the magnetic medium into the interface unit, which in both cases will be possible only if the device identification matches that of the meter (Amnie, 2016).

As post-paid customers purchase certain units of electricity from EEU they claimed to be free of the bill payment hassles that experienced by the post-paid subscribers. On the other hand, the post-paid subscribers, too, have experienced the convenience of paying bills through more than one option because, currently EEU has offered them different payment options, such as; online (electronic) payment, direct debit and they are also paying though CBE branches.

The post-paid billing system of EEU follows a monthly billing cycle and involves major activities of meter reading including data entry, bill generation including bill calculation, bill printing, bill cutting and batching and bill collection. Meter reading of monthly electricity consumption of the customers, is based on manual meter reading, where meter readers take the meter reading and notes the consumed unit of electricity shown on the meter with a reading book and then enter reading for billing and updating customer database. Once the data input for a particular billing period completed, the bill processing activity starts and when completed the bills are distributed to the CSCs for collection.

With the aim to ending the time and energy the clients want to spend to pay their bills, EEU has signed an agreement with the CBE, another state company, which can be collecting the bill for EEU. Accordingly, in addition to the CSCs, post-paid customers have the option to make payments at the CBE, mobile banking, internet banking, and by directly transferring from a bank account (Hizkel, 2019). In Ethiopia, electric bills paid in two main different ways; those are traditional cash basis (conventional) methods and Electronic (Online) bill payments methods.

2.2.1. Conventional (Traditional Cash Basis) Method of Bill Payment

Conventional payments through cash, check or credit card are still the primary means of payment in Ethiopia. In this regard, customers of EEU have two alternative modes of bill payment paying at CSCs and paying though CBE branches.

2.2.1.1. Bill Payment through the Payment Centers (CSCs)

Once the data has entered and processed for a particular period, the Districts that controlled and initiated the processing distributed the printed bills to the collection centers. The synchronization of dispatch of bills with the payment periods for each payment zone within the district is essential, to ensure that the bills have arrived at the collection centers when the customers come to pay their bills. In the fully computerized collection centers, however, a delayed bill will not delay payment of bills because all necessary data for registration of the bill will be available on the collection center terminals. The collection centers (CSCs) are normally located within walking distance from where the customers live. Usually, customers only allowed paying at designated collection centers (Curated Content, 2018).

2.2.1.2. Bill Payment through the Bank

In this case, like in the case of payment through ATM The EEU has collaborated with different banks to ensure that its customers can easily clear their electricity bills through making bank deposits banks (Curated Content, 2018). In order to pay electric utility bill through bank customers has to follow the following alternative procedures:-

A. Bill Payment through Cash

To pay the bill through cash: First, the customer goes with his / her bill or customer reference number to the bank then he/ she presents the bill/customer reference number to the cashier at the counter in the bank, also give the cashier the amount of money to be paid against the bill and wait for a receipt. Finally, the cashier issues a receipt that the customer must keep well (Curated Content, 2018).

B. Bill Payment through Account Transfer

All the above procedures are the same except that customers are required to fill "account to account transfer form" used only for monthly electric utility bill payment. Customers are required to have an account in the bank or to open a new account in that bank (Curated Content, 2018).

C. Bill Payment through Direct Debit Standing Instruction (DDSI)

Customers are required to make an agreement of direct debit standing instruction with the bank, that order the bank to pay their monthly electric utility bill based on the data sent by EEU to the bank. Customers are required to have an account in the bank or to open a new account in that bank (Curated Content, 2018).

2.2.2. Electronic (Online) Method of Bill Payment

An electronic payment is, carried out through the means of software, payment cards and electronic cashes (Taddesse & Kidan, 2005). Under this category, customers of EEU have three alternative modes of bill payment: Mobile money, ATM/POS and Mobile and Internet Banking.

2.2.2.1. Bill Payment through Mobile Money Services

Customers can pay their bills monthly through Mobile Phones. Payment is made using customers personal phones or agents located near them i.e. streets through cash. It is as easy as buying a recharge card with a minimal fee charged for transaction and an e-receipt issued as an evidence of payment made. In this form, EEU has collaborated with different

telecom companies to ensure that its customers can easily clear their electricity bills and this applies to customers with meters (Curated Content, 2018).

Therefore, the customers who have the interest to use this service must be a subscriber in one among the partnering telecom companies. This is often an applicant must have a line (Sim-card of one of the partnering companies). There after register the Sim-card for mobile money services at any of the branches of the chosen company; Insert line in a phone and access its mobile money menu. The menu is, typically accessed by dealing with a specific number usually set by telecom companies, when the menu appears, select the Pay Bill option. The wording of this feature may change based on the corporate selected but meaning will still is equivalent. Then the information is required like reference numbers and the amount of cash to be paid. (The required vary basing on the telecom company selected); Therefore submit information and wait; A message shall be displayed which allow information filled and here the customer is required to cross check to ascertain if the knowledge filled is correct. If all is correct then proceed with making payment. The customer shall be required to enter his / her pin code so as for the payment to be processed (Curated Content, 2018).

Then, after payment is processed the customer receives a confirmation message for the payment from the telecom company showing the amount of cash paid, the account number, and balance on the mobile money account; Then another message to verify the transaction received. The message always shows the customer Meter Number, Receipts, Unit Purchased, Cost Used, and Token Numbers which you will enter into the meter in cases of consumers with digital meters (Curated Content, 2018).

2.2.2.2. Recharge via ATM

As part of the effort to promote E-payment and run a cashless society EEU have introduced utility payment via ATM/POS; the customer's account is debited while the EEU account is credited via virtual transfer on the ATM machine and POS, a transaction fee is charged and an e-receipt issued to customers at the end of transaction. In this form, the EEU has collaborated with different banks to ensure that its customers can easily clear their electricity bills by use of Auto Teller Machines. This method is also convenient for customers with Digital meters (Curated Content, 2018).

To use this approach for paying electric bill, you must start by opening up an account in any of the partnering banks and make sure that you will obtain a credit card of the chosen bank; Insert the credit card in the ATM of an equivalent bank; Select an appropriate language for you; Enter your identification number given by the bank at the time of receiving the bank card; Then select the choice other services; Then select the choice recharge services; Then select Company supply you power; Thereafter enter the customer meter number; Select the prompt Proceed Then select the amount you would like to pay. During this case, if the amount exceeds 100,000, select the choice other amounts; Thereafter confirm the amount and finally a slip with a pin number, shall be issued take the slip (Curated Content, 2018).

2.2.2.3. Bill Payment through Internet Banking and Mobile Banking

To pay their electric bill in this platform, customers should have to be a user of internet banking or mobile banking, download the application in their mobile phone, and connect it with their bank account, and a customer should have to know the 12-didit contract account number (Curated Content, 2018).

2.3. Electronic Bill Presentment and Payment (EBPP)

As the objective of any utility is to ensure that collections are kept at as high level as possible, thus to ensure high collection rates the utility should have systems in place so that it is easy for customers to pay their bills, and this can be done by providing appropriate payment alternatives (Nickson & Hay, 1991). In line with this, utility companies are interested in finding effective ways both to provide improved customer service and reducing their costs, a graceful way to do both is with Electronic Bill Presentment and Payment (EBPP) (Netscape Communications, n.d.). Electronic Bill Presentment is the electronic transmission of bill detail from businesses to consumers and Electronic Bill Payment is the process of performing electronic payments between the consumer, the biller, and the financial institution. Electronic Billing Presentment and Payment (EBPP) are online payment systems for monthly bills and that enable consumers to pay their bills by electronic means while they view their bills electronically (Taddesse & Kidan, 2005).

Electronic Bill Presentment and Payment (EBPP) is the electronic presentation of statements, bills, invoices, and related information sent by a company to its customers, and corresponding payment for goods or services. The Internet provides billing companies and

their customers with new methods to deliver and access billing information (Wayner, 1997).

Although, Taddesse & Kidan (2005) stated that the key actors of EBPP are billers, customers, commercial banks, and third party processors, including telecom companies; there can be a multitude of EBPP models based on whether the bill is accessed from a biller's web site, through bill consolidators, or from a portal provider (Hallis, 2002). While there are numerous kinds of EBPP arrangement generally, there are two types of EBPP models namely direct model and indirect model.

2.3.1. Direct Biller Model

The direct biller model is an approach where the billers create and present the electronic bills through its own corporate website/web page and customers view and pay their bill by entering in to the biller's website. From the biller's perspective, they greatly value the opportunity to provide an interactive, personalized experience to each of their customers each month, however if every biller did the direct biller model, the consumer would need to go to numerous web sites each month just to pay their bill, which is not very convenient to the consumer (Netscape Communications, n.d.).

2.3.2. Indirect Biller Model (Third Party)

In this model an external third party bill processor, facilitate bill presentment and payment where the bills are, presented for customers through bill consolidator presenting multiple companies' bills or through portal provider. Again, a third party bill processor can be either the thick consolidator model or the thin consolidator model (Hallis, 2002).

2.3.2.1. The Thick Consolidator Model

As Netscape Communications (n.d.), define thick consolidator bill presentment as when the biller's summary and detail data is provided to a bill consolidator, who then presents it to the customer. As the consumer must go to a specific site where all of their biller data is located, the risk here is that consumers may not want be locked into a single site, and the billers may not like being locked in either.

2.3.2.2. The Thin Consolidator Model

As defined in Netscape Communications (n.d.), a thin consolidator bill presentment is when the biller's summary data is provided to a bill consolidator that then presents the bill

detail to the customer on request. Thin consolidators aggregate bill summary information from multiple billers and collecting bill from several sources and presenting all in the web sites for viewing and payment and link a customer back to the biller's web site if the customer request detailed information.

2.3.3. Benefits of Electronic Bill Presentment and Payment

E-bills (Electronic bills) services that are taking bills to a new level as its moving it from the traditional way that the customers used to pay their bills and payments by cash in the specified place to pay it, it takes more costs, time and energy. The electronic bills made it easier to use, new applications and websites lunched lately to make it easier and reachable for more customers to use it anytime and anywhere. Today non countable services are available online to be used by different ages and both genders, such as electricity, water, gas and other bills, even schools and universities payments could be paid by the new applications and websites that offer the electronic payments services (AL-Ashqar, 2018).

Online payment lowers the costs for businesses as the more payments made electronically (online or offline) the less they spend for paper and postage, and also it helps to improving customer retention as he is more likely to return to the same e-commerce site where his or her information has already been entered and stored. Moreover, with online payment it is not necessary for the payer to be in a long queue as payment is, made in just a click of a mouse (Acosta, 2008).

With the use of EBPP, both the biller and the customer will benefit (Hallis, 2002). The benefits to the customer include: improved customer service, reduced postage fees and time associated with manual payment of bills, costs savings in associated transaction, the benefit of the float in that they have finer control over the date and time they pay the bill and the additional analysis that they can do on the detailed content of the bill. On the biller side EBPP serve as a strategic points of contact with customers; creates an opportunity to build customer loyalty through better service, responding routine billing questions, providing payment history and bill details on demand; and a vehicle to speedup bill collection and cost savings by reduction of the billing cycle float involving mailing, processing times, and funds availability.

As Kumari & Khanna (2017) stated, the Cashless payments have several benefits which are never available through traditional payment method, some of which are privacy,

integrity, compatibility, efficiency, acceptability, convenience, mobility, low financial risk, and anonymity.

1. The simplicity of doing financial transactions: There is ease in doing financial transactions, which may be the biggest motivator for Go-Digital. In non-cash payments, there is no need to bring a lump of cash or even queue up in long queues at the bank. This will be very useful in case of an emergency. Users can pay easily during business hours;
2. Reduce risk: This policy will help combat corruption/ money laundering and reduce the risk of carrying cash and reducing costs;
3. Reduce tax avoidance: Non-cash transactions benefit from tax avoidance reductions;
4. Transparency: It is not only the easiest way to transact but also bring much more transparency into the financial system, which helps reduce revenue from corruption or money laundering;
5. Cleanliness: It will also help in improving hygiene and can eliminate the spread of bacteria through paper money and coins.

Although, various benefits are offered through online utility bill payments, in Ethiopia the payment of utility bills is rather different to the systems established in other countries. According to Demirguc-Kunt et al. (2018), in 2017 out of total utility bills paying Ethiopian customers, 99 percent paid using cash only, whereas the corresponding figure was only 12 percent in Kenya, 27 percent in Tanzania, and 59 percent in Sub-Saharan Africa on average. At the same time, out of total Ethiopian wage recipients, only 0.2 percent received through a mobile phone, compared to 37 percent in Kenya, 24 percent in Tanzania, and 19 percent in Sub-Saharan Africa on average.

2.4. Theoretical Background

All products do not have the same possibilities for consumer acceptance, some products can become popular in just one night while others require a very long time to receive or even never be widely accepted by consumers (Syahadiyanti & Subriadi, 2018). Although, several models and theories have been developed to study technology adoption Technology Acceptance Model (TAM), Innovation Diffusion Theory (IDT), Unified Theory on Acceptance and Use of Technology (UTAUT) are amongst the popular ones (Ibidunmoye, 2018).

2.4.1. Technology Acceptance Model (TAM)

This model is, mainly used to predict users' acceptance, use of particular information systems and understand the motives and likely problems facing users of the system (Ibidunmoye, 2018). It is a generalized framework that combines the Theory of Reasoned Action (TRA), its extension the Theory of Planned Behaviour (TPB) in which the real behaviour of a person is influenced by the intention of the behaviour, while the intention to behave in a certain way is influenced by one's attitude towards subjective objects and norms (Widayat et al., 2020).

According to Widayat et al. (2020) in TAM model the acceptance of a new technology by users depend on two main factors, notably:-

1. **Perceived Usefulness:** is defined as the degree to which a person believes that using a particular system would enhance his or her job performance, and
2. **Perceived Ease of Use:** is also defined as the extent to which a person believes that using a particular system will be free from effort.

These factors then determine the user's attitude towards the use of technology. A person's attitude will determine his or her behaviour and, in turn, affect actual acceptance.

Although, the TAM model has various benefits such as excellent measurement properties, conciseness, generic to users' and empirical soundness but the limitation of this model according to is that it provides general information about ease of usefulness and it has also been criticized by many researchers for its parsimony (Ibidunmoye, 2018). It is also restricted to focus on level of perceptions concerning only two constructs: the ease of use and perceived efficacy of this emerging technology. These two constructs are logically subsumed within two of the innovation attribute constructs of complexity and relative advantage within DOI theory. Moreover, this theory has not accounted for other potentially influential innovation attributes as well as the role of several adopters characteristics (Saviak, 2007).

2.4.2. Unified Theory on Acceptance and Use of Technology Model (UTAUT)

According to Ibidunmoye (2018), this theoretical model aims to explain the interests of users for using information system and the behaviour of next users, and some of the variables which affect user's intention to use something are performance expectancy, effort expectancy, social influence, and facilitating conditions.

1. **Performance expectancy:** which is an act in which a person believes that using information system will help one achieve gains in performance,
2. **Effort expectancy:** is a level of convenience associated with the use of a system,
3. **Social influence:-** is the degree to which peers influence the use of the system, and,
4. **Facilitating condition:** also refers to a person's belief that organizational and technical infrastructure facilities are available to support the use of the system.

The model has four other moderating variables namely: gender, age, education and voluntariness of use, which considered as factors that directly influence the relationship between the dependent variables and the independent variables. Although this model can be used to predict expectancy, intention and attitudes towards the acceptance of technology, it is a bit complicated as it encapsulates eight other research models predicting IT usage behaviour and it has also been criticized for having many citations without actually using it (Ibidunmoye, 2018).

2.4.3. Diffusion of Innovation (DOI) Theory

The theoretical background of this study is, mainly drawn from the innovation diffusion theory; in which the characteristics of an innovation determine its speed of adoption process. Diffusion reflects the percentage of population that has adopted an innovation at a specific point in time (Hoyer & MacInnis, 2010).

The diffusion of innovations (DOI) theory was proposed by Rogers (2003) which could be considered as one of the most popular theory have attempted to explore factors that affect an individual to adopt an innovation or a new technology. IDT is a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures. Diffusion is defined by Rogers (2003) as the process by which an innovation is communicated through certain channels over time among members of a social system. Consequently, diffusion processes result in the acceptance or penetration of a new idea, behaviour, or physical innovation. Innovation in this case refers to a new concept or artefact that is introduced to individuals. In this study, the use of online electric bill payment is regarded as an innovation. A channel refers to the medium, which is used to transmit information from one individual to the next Rogers (2003), social system refers to the relationships that exist between individuals, their characteristics, roles and status within communities Rogers (2003).

One criticism against the diffusion model has been its pro-innovation biasness. Diffusion theorists believe that the innovations should be adopted by all members of a social system or society, in a quick time frame and that such innovation should not be rejected or re-invented. Furthermore, this model has some limitations such as it is a non-participatory approach, the negative impacts of the theory was not considered, it assumes adoption of innovation is always desirable (normative) and it tends not to evaluate innovations from an end-user perspective (Ibidunmoye, 2018).

Despite these limitations, this study adopts the DOI theory as a theoretical framework that is used to understand and explain the adoption of online electric bill payment. The rationale being that it is one of the most popular theories and it has been used in a wide range of disciplines, such as public health, political science, economics, communications, technology, education and history (Mhlongo et al., 2017). This means that by using this theory it is possible to compare the findings of the study to other similar studies. Furthermore, a number of previous studies have used the DOI theory to examine the adoption of Internet-based technologies and have consistently concluded the DOI variables, particularly those of relative advantage, simplicity, and compatibility, as the most frequently salient factors for adoption of Internet and mobile technologies (Al-Jabri & Sohail, 2012).

According to Rogers (2003), from 49 to 87 percent of the variance in rate of adoption of an innovation is, explained by the following five attributes or characteristics of that innovation:

1. **Relative advantage:** is the degree to which the innovation is perceived as being better than the idea it supersedes. The degree of relative advantage is often expressed in economic profitability, in status giving, or in other ways (Rogers, 2003);
2. **Compatibility:** is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. An idea that is more compatible is less uncertain to the potential adopter. An innovation can be compatible or incompatible with sociocultural values and beliefs, with previously introduced ideas, or with client needs for innovations (Rogers, 2003);
3. **Simplicity or Complexity:** complexity is the degree to which an innovation is perceived as relatively difficult to understand and use, whereas simplicity is the degree to which an innovation is perceived as relatively easy to use and understand. Any new idea may be, classified on the complexity-simplicity continuum. Some innovations are

clear in their meaning to potential adopters while others are not (Rogers, 2003). Complexity of an innovation is, negatively related to its rate of adoption while simplicity is positively related to its rate of adoption. Therefore, complexity can be considered as the exact opposite of simplicity. According to Davis (1989), simplicity (ease to uses) is the degree to which a person trusts that using a particular system would be freed from a difficulty that is, utilizing a specific technology would be free of physical and mental exertion.

4. **Trialability:** is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be, tried on the installment plan will generally be adopted more rapidly than innovations that are not divisible (Rogers, 2003);
5. **Observability:** is the degree to which the results of an innovation are visible to others. The results of some ideas are easily, observed and communicated to others, whereas some innovations are difficult to describe to others (Rogers, 2003).

2.4.3.1. Socio- Demographic Factors

Demography is the study of human population statistics, including size, age, sex, race, location, occupation, income, education, and other characteristics (Ong'wen, 2012). There is a consensus among researchers that demographics play a significant role in determining consumer attitudes and behaviour towards new technology acceptance (Teka & Sharma, 2017). For instance, age, education level, income and occupation are the most influential demographic variables affecting Internet usage (Ong'wen, 2012).

According to Rogers (2003), earlier adopters of technological innovations are typically younger in age, having higher incomes, better educated, and having higher social status and occupation, and more reactive to new innovation than the non-adopter. Rogers (2003) also indicates that innovative individuals have positive attitudes, ability to communicate with others and a high level of social participation. While a vast number of studies have pointed out the keys to the adoption of online payment, but little attention have been paid to the demographic factors that might influencing its adoption. Thus, this research sought to examine the influence of the key socio-demographic characteristics, which are age, income, employment, educational level and customer type on the adoption of online electric bill payment by incorporating them into the DOI theory.

2.5. Empirical Framework

Here under some of the previous studies conducted to identify factors that determine the adoption of new technology are reviewed and discussed.

2.5.1. External Empirical Reviews

He et al. (2006) made a study on the adoption of online e-payment in Chinese companies. This study examines the adoption of online e-payment by business enterprises using Rogers' relational model of perceived innovation attributes and rate of adoption. The findings show that only perceived compatibility has a significant influence on the online e-payment adoption of Chinese companies.

A study conducted by Izogo et al. (2012) to examine the impact of six demographic variables namely gender, marital status, religion, income, age and education level on the adoption of e-banking in Nigeria show that the influence of marital status, age and education level on the adoption of e-banking is significant.

Another research conducted by Mutengezanwa & Mauchi (2013) to determine the socio-demographic factors that influence Internet banking adoption in Zimbabwe revealed that age, occupation, income, gender and educational level had positive relationships with internet banking adoption. Similarly, Ong'wen (2012) assessed the impact of demographic factors that influence the adoption of internet banking in Kenya, and the key findings revealed that demographic factors including age, income, education level and occupation have a relationship with the adoption of internet banking.

Al-Jabri & Sohail (2012) were examined the adoption of mobile banking in Saudi Arabia by using the DOI theory as a baseline. Their result shows that relative advantage, compatibility, and Observability have a positive impact on adoption while Perceived risk has a negative impact on the adoption of mobile banking.

The study of Serener (2016), was also aimed to analyse the characteristics of internet banking users in Northern Cyprus where logistic regression model was used to evaluate the impact of age, gender, income, marital status, education, and profession on the likelihood of people using internet banking. The results indicate that 56-65 year olds (older persons) were less likely to adopt internet banking than 18-25 year olds (younger persons) while married individuals were less likely to adopt internet banking than single respondents were. In addition, the odds of adopting internet banking were higher for male respondents

compared to females. Furthermore, the result indicates that the likelihood of adopting internet banking rose with increasing levels of income and respondents with master's or PhD degrees were more likely to adopt internet banking compared to primary and secondary school graduates. Moreover, sole proprietors, public sector workers, private sector workers and students were less likely to adopt internet banking than banking personnel.

A qualitative study by using the UTAUT as a theoretical framework by Ibidunmoye (2018), was aimed to identifying the factors that influence consumer's adoption of mobile payment system in Sweden. After, the data has been collected through semi structured interview and the collected data were analysed using thematic analysis, impact on day-to-day activities, speculation of risks and trust of the system, speculation of user friendliness and flexibility, integration to lifestyle, age and peer influence were identified to be factors influencing the adoption of the mobile payment system.

Jakupovic (2018) has studied the factors influencing consumer's intention to use an online payment method and how the usage intention affects buying behaviour, in this study technology acceptance theory and the acceptance of mobile payments model were, employed to understand consumer's online payment behaviour. Based on the finding, consumer's intention to use an online payment method is, affected by attitude, perceived usefulness and perceived ease of use, but perceived risk does not affect usage intention.

A study made by Abayomi et al. (2019) examines the demographical factors that affect customers' adoption of mobile banking services in Benin City. The study specially investigated age, occupation, educational level, gender, and income of consumers as powerful variables that affect the adoption of mobile banking services by customers in Benin City. The result showed that all demographic factors except educational status influence the adoption of mobile banking services in Benin City

Kaur et al. (2020) examined variables influencing the diffusion of mobile wallets in India, they used DOI to investigate participants' intention to use (IU) and intention to recommend (ITR) mobile wallets in India, and their finding suggested that relative advantage, compatibility, complexity, and observability were key drivers of participants' IU and ITR mobile wallets. Trialability had no association with participants' IU and ITR mobile wallets, and finally they assured the suitability of DOI for examining consumer intentions toward mobile payments. According to their findings, the following variables

were found to be significantly associated with greater intention to use and recommend mobile wallets those are users understanding about advantages of mobile wallets; users perception about consistency of mobile wallet; users perception about easiness of mobile wallet and seeing others using mobile wallets. However, personal innovativeness of potential users and the opportunity that mobile wallets offer for a trial of transactions had no relationship with the intention to use and recommend mobile wallets.

Widayat et al. (2020) have made significant research to investigate customers' adopting factors and the implication for open innovation (e-money payment) in Indonesia. To undertake this study they used quantitative and qualitative approaches (mixed methods) and also they use online questionnaires, which included closed-ended questions on a Likert five-point scale, and open-ended questions were distributed through social media chat groups. The results of their study show that the most reasons that customers adopt electronic money are its practicality ease of use, efficient transaction time, faster payment, and therefore the simplicity of the payment process. They verify the significant influence of social factors, effort expectancy, and facilitation conditions on e-money attitudes. In addition, social factors, effort expectancy, and attitudes have a significant influence on e-money behaviour.

2.5.2. Empirical review in Ethiopia

(Taddesse & Kidan, 2005) studied the challenges and opportunities of e-payments in Ethiopia and found that the main obstacles to the development of E-payments are lack of customers trust in the initiatives, unavailability of payment laws and regulations particularly for e-payment, lack of skilled mane power and frequent power disruption.

Haile (2015) has examined the factors affecting the adoption of mobile banking in Commercial Bank of Ethiopia (CBE) based on the UTAUT model. Based on the finding of this study Performance and Effort expectancy; perceived Risk, Cost, and Trust were the factors affecting users having intention to adopt mobile banking while the Quality of Mobile banking service was, found to be insignificant in this study. In addition, from demographic variables, Age and Occupation were, identified as a significant factor for adoption of mobile banking; but Gender and Educational qualification were not a significant factor for adoption of mobile banking.

Chandrasekar & Taye (2017)were attempted to study on the adoption of Automated Teller Machine (ATM) in Commercial Bank of Ethiopia (CBE) in Addis Ababa by using DOI theory. Based on the analysis the dependent variable (Adoption of ATM) was positively and significantly associated with the independent variables (Relative Advantage, Complexity, Compatibility, Observability and Trialability).

Melka (2017) also examined the determinants of online payment systems diffusion in Addis Ababa, the case of potential adopter buyers and potential adopter sellers by using DOI theory. This study revile that, in the case of potential adopter buyers only compatibility, trialability and observability were found to be significantly determining diffusion of online payment system in a positive direction and in the case of potential adopter sellers, only relative advantage has shown a positive and significant influence.

Another study made by Gofe & Tulu (2019), assessed the determinants of consumers' e-payment utilization in CBE the case of Nekemte town. The major finding of the study shows that among the demographic associated factors customer's education and income level has positively influenced their E-payment Utilization activities. Whereas among the institutional related factors the network interruption and service charge levied by the bank has a negative influence while the customer satisfaction and price reduction concern features a positive influence on their E-payment utilization activities. Finally, among the customer-related factors, both perceived risk and lack of willingness to use the service have a negative influence on their E-payment utilization activities within the study area.

Abebe & Lessa (2020) were analysed the factors that affect merchants' adoption of mobile payment in Ethiopia by taking CBE Birr and M-birr as a sample and focusing on the effect of the following factors on merchants' adoption of mobile payments: perceived ease of use, usefulness, relative advantage, compatibility, trust, perceived risk, attitude, and cost of mobile payment service. The result suggests that relative advantage, ease of use, usefulness, attitude, trust, risk/security and cost are factors that affect mobile payment adoption positively and significantly, however, compatibility is not significant factor for merchants' adoption of mobile payment systems in Ethiopian context.

2.5.3. Knowledge Gap

Even though there are a number of studies conducted in Ethiopia on the adoption of (online) E-payment system specifically on mobile banking and internet banking, there is

no research made in Ethiopia regarding factors that influence the adoption of online utility bill payment, particularly in electricity sector. Besides that, most of the previous related studies on similar innovations including ATM, mobile banking and internet banking as explained in the previous related work above all had differing focuses. Some focused on assessing consumers' e-payment utilization who already have adopted the new payment system (Gofe & Tulu, 2019) while others predicted future users' intention towards adopting a payment system (Melka, 2017).

Secondly, since most research studies are based on TRA and TAM theories, which consist of two constructs; perceived ease of use and perceived usefulness which are not sufficient to explain factors affecting adoption of a new payment system and there is need to adopt another theory that include more variables. This study employed the DOI theory that has proven valuable in predicting the adoption and utilization of new technologies across a wide range of fields. Additionally, departing from the approach used by previous researches (Chandrasekar & Taye, 2017) and (Melka, 2017) this study has integrated the socio-demographic variables into the DOI theory.

Finally, given the fact that the concept of online electric bill payment system is relatively new in Ethiopia coupled with lack of research work done in this area as many still focus on other E-payment methods such as Internet banking only through quantitative approach. It is important to know the views of the consumers in relation to what factors motivate their choice or otherwise and what consumers think about the system through qualitative lens. This will shed more light on the topic and give a deeper understanding to this research area. Therefore, having employed a mixed approach this study explores the reasons that why not customers adopting the online electric bill payment system, which explores the main reasons of non-adoption as well as the associated challenges and benefits to the adoption of online electric bill payment. Therefore, this study is an effort to fill in the existing knowledge gap due to dearth of study.

2.6. Conceptual Framework

For predicting users' acceptance of a new technology any of the three models discussed under the theoretical background section can be used. However, since all these models have their own limitations and drawbacks, the selection of a model should have to be, based on objectives of the research study. Therefore, the DOI theory was used in this study to evaluate the adoption of online electricity bill payment from the innovation characteristics (i.e., relative advantage, complexity, compatibility, trialability and observability) perspective and demographic factors (i.e., age, education, employment, income and customer type) are considered in this study.

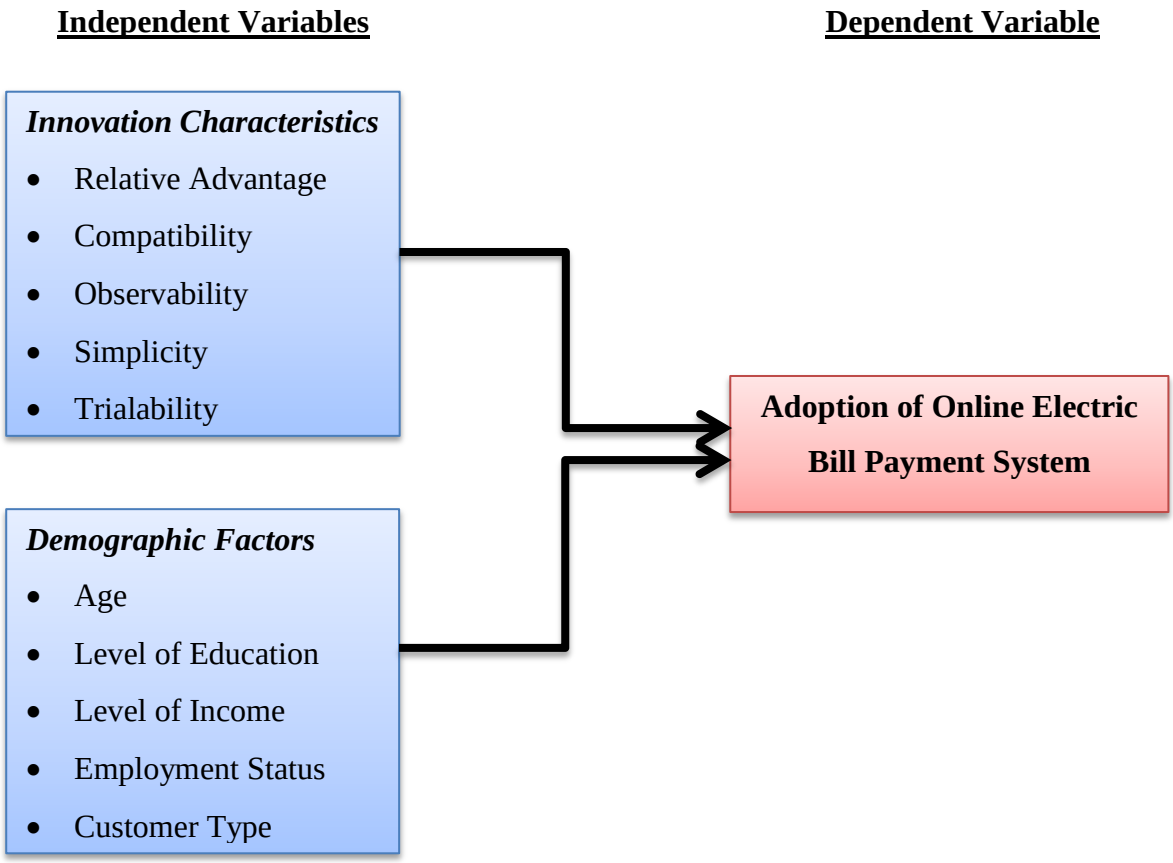

Figure 2-1: Conceptual Framework of the Research

Source: Adopted from E. M. Rogers (2003)

CHAPTER THREE

3. RESEARCH DESIGN AND METHODS

This chapter highlights the type and design of the study, subjects of the study, sources of data, data collection instrument employed and the procedures of data collection and methods of data analysis used in order to achieve objectives of the study.

3.1. Research Approach

In this study, a mixed research approach was employed in which both qualitative and quantitative research approaches are used. The quantitative approach involves the generation of data in quantitative form, which can subjected to rigorous quantitative analysis while qualitative approach involves the collection of data in a qualitative form in which only simple descriptive analysis are performed (Kothari, 2004). A mixed approach can helps to have rich insights into various phenomena of interests that cannot be, fully understood using only a qualitative or a quantitative method; since it addresses the constraints imposed in using only one approach to gather data and permits to statistically analyse the scientific data (Kothari, 2004).

In order to attain the objective of the study and answer the research questions the researcher adopted (apply) a cross-sectional survey design, where a sample of population is studied to determine its characteristics, and it is then inferred that the population has the same characteristics at a single point of time (Kothari, 2004). Accordingly, for this study quantitative inferential approach and descriptive qualitative approach were followed.

3.2. Type of Research

Based on the purposes of conducting research, any study classified in to three categories as exploratory, descriptive and explanatory (Robson, 2002; Saunders et al., 2009): Exploratory research, characterized as the seeking of new insights, the looking around, and the asking of questions or the bringing of some phenomenon into new light. Explanatory research, aims at gaining an explanation of a specific circumstances or problem, generally in the form of causative relationships; and finally descriptive research, is a type of research that is essentially concerned with describing the nature or condition and the degree in detail of the present situation.

To achieve the objective of the study the researcher used both explanatory and descriptive type of research scheme. The explanatory type of research design helps to identify and evaluate the causal relationships between dependent variable (Adoption of online electric bill payment) and independent variables under consideration. The descriptive type of research strategy also helps to assessing and describing the current bill payment practice or situation and the problem of electric bill payment, and to highlight the benefits and challenges associated with online electric bill payment. Furthermore since the study applies frequencies and measures of central tendency to describe profiles and see average responses, and inferential statistics methods to check and explain relationships between the study variables this research is categorised as both descriptive and explanatory.

3.3. Target Population

This study was, conducted to assess challenges in electric bill payment and to explore and better understand factors that influence customers' adoption of online electric utility bill payment as well as the associated benefits and challenges of online electric bill payment therefore, population of study comprised of all post-paid customers of EEU. However, since the customer of EEU is very wide that covers the whole population the researcher selected EEU Jimma District as a study area. EEU Jimma District selected because the researcher is familiar with the area and the community, and thus provides a convenient site. Out the total fourteen (14) CSCs of EEU Jimma District, two (2) CSCs Agaro CSC #2 and Sokoru CSC were selected purposely. The rationale for selecting these two towns is that they are among the four relatively big towns in Jimma districts where online payment of electric bill were already started. One of the objectives of this study was identity factors affecting online payment of electric bill. Therefore, the target population of this study was post-paid customers of Agaro and Sokoru town CSCs with a total number of 5,305 post-paid customers. Specifically, the total numbers of post-paid customers of Agaro town CSC #2 are 1,869, while the total numbers of post-paid customers of Sokoru town are 3,439.

3.4. Sampling Techniques and Sample Size Determination

In order to avoid bias the researcher employed a probabilistic simple random sampling technique to select a representative sample of post-paid customers from the target population. A formula provided by Yamane (1967) to calculate sample sizes of finite population, which is used to determine the sample size for this study. Since in social science 1% up to 10% of errors is acceptable, for the purpose of this study the researcher

was accepted a 6% margin of error due to of lack time and fund to collect data from large sample Admasu et al. (2007). Then, the samples were further stratified proportionally by the number post-paid customers in each CSC and finally 264 post-paid customers were, selected through a simple random sampling technique. Accordingly, the sample size is determined as follows:

$$n = \frac{N}{1 + N(e^2)}$$

Where: n = is the required sample size,

N = is the population size and

e = is the level of precision.

Applying the above formula gives:-

$$n = \frac{5{,}305}{1 + 5{,}305(0.06^2)}$$

$$n = \underline{264}$$

The next step is to determine the size of the sample to be, sampled from each CSC by using a proportionate random sampling method that shown below in Table 3-1.

$$\textbf{Proportionate Random Sampling Formula} = \frac{\textit{Total Sample Size}}{\textit{Total Population}} \times \textit{Population of Each CSCs}$$

Table 3-1: Sample Size for Each CSC

Name Of CSC	Population Of CSC	Sample From Each CSC
Agaro town CSC #2	1,869	93
Sokoru town CSC	3,436	171
Total	**5,305**	**264**

Source: Researcher own construction.

3.5. Sources and Type of Data

Since data from secondary sources were used only to develop the literature review part, to have the basic knowledge of the ideas to be investigated, to construct theoretical and empirical framework, and to develop propositions, for this study the main sources of inquiry was primary sources that were collected from respondents (post-paid customers of both CSCs). In this study, the researcher used open-ended and close-ended questionnaires, and Likert scaling technique questionnaires were, used. To collect data paper based self-administrated questionnaires were distributed to target respondents. Likert scaling is a

summated rating scale that consists of a series of statements concerning an attitude object. Scores of individual items were also summated to produce a complete score for the respondent. Concerning this study's independent variables, respondents were asked to indicate their level of agreement on a five-point Likert scale, as follows: 1= Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree. The Likert scale is used because; the Likert scale can make data collection easy and improve the accuracy of data. More the respondents were not bored in writing a long sentence and they can fill with enthusiasm.

3.6. Data collection Instrument and Procedure

The instrument used for data collection was a paper-based questionnaire developed by the researcher based on the research questions and the literature in order to come up with the scales for measuring and operationally define the constructs.

The questionnaire has four (4) sections excluding an introductory statement, which specified the purpose of the research as purely academic that aimed to assure confidentiality and encourage them being objective in their responses. Section A was for background information of the customers. Section B was for the issue of electric bill payment practice and the associated problems, as well as the benefits and challenges faced by customers while using the online electric bill payment system and Section C was for factors influencing adoption of online electric utility bill payment comprising of fifteen (15) Likert type questions for innovation attributes. Finally, in Section D the respondents were, requested to provide open-ended responses if they have opinions that they feel the researcher would find useful.

The questionnaire was, administered to the respondents following a direct disbursement and collection through face-to-face manner where data collectors give the questionnaires to respondents and stay a bit away for the privacy of the respondents and they may contact them when they have any queries. In addition to supervision by the researcher at the time of data collection, the data collectors were, given training and orientation on the selection of the participants, the content of the questionnaire, and COVID-19 protocols. At the starting of the orientations, a mask, and hand sanitizer have been, provided to all data collectors. To start the data collection process data collectors, along with the supervisor (the researcher), determined the central geographical location of the area to be surveyed as the starting point for selecting the study participants. For this purpose, both natural and

synthetic features have used as a reference such as mill, school, church, mosque, road junction, bridge, enterprise, shop, water pump, garage, hotel, and other facilities have been used by taking a permanent marker from one of the features near the starting point of the sample. Following a clearly defined walking pattern, the supervisor mobilizes data collectors in all four directions to collect the data from a randomly selected respondent.

The data collector starts by briefly introducing himself or herself to the randomly chosen potential respondent; then to get the right respondent the data collectors would ask a customer if he or she had ever paid electric bill in the last one year. If the potential respondent answered YES, the data collector would proceed with informing the potential participant about all aspects of the research task to get their full consent; and that they selected randomly and their participation is voluntary, and that they could with draw from the study if they needed to. Otherwise if the potential respondent answered NO or in cases of non-response and unwillingness to take part in the study, the data collector would move to the next customer.

3.7. Variable Definition and Measurement

This study includes the variables of an innovation diffusion theory and other variables. DOI has been, considered as a landmark theory because, it was designed to understand how a product or service originates, gains momentum, and diffuses across society. Rogers (2003) defined diffusion as a process through which an innovation propagates in a social system over time and he suggested that innovations offering compatible, simple, trialable, relatively advantageous, and observable solutions were more likely to be adopted quickly. The summary of the dependent variable, the independent variables, and their symbols and how they are measured is shown below in Table 3-1.

3.7.1. Dependent Variable

This is the outcome or criterion variable caused by the variation in the independent variable. The dependent variable that used in this research is the adoption of online electric bill payment. The rate of adoption is the speed at which a potential adopters or users acquired and used a new technology. This rate can be represented by the number of members of society who start using new technology or innovation during a specific period

Adoption: Is measured as a dichotomous variable showing whether a person is an online electric bill payment system user or not.

3.7.2. Independent Variables

The independent variables are the five attributes of innovation and demographic variables. Except for the demographics, all items are measured with a 5-point Likert scale as 1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree, while demographic variables are measured as categorical variables for educational status, employment status, income and customer type, and as continues for age.

Attributes of innovation

Relative advantages: Is the degree to which an idea is considered a better than the ideas that exist before, and is economically profitable (Rogers, 2003). The relative advantage of an innovation is positively related with its rate of adoption. This tends to give a reasonable explanation for the adoption of innovations, as the higher the economic or social relative advantages of the innovation, the more likely it is that they will adopt the innovation. The relative advantage in this study context is the degree a user believes online electric bill payment system is more advantageous than the other method of payment and measured by three (3) items, which measure the degree of economic profitability because of savings in time and effort, a decrease in discomfort, and risk reduction.

According to the result of the study made by Kaur et al. (2020) and Abebe & Lessa (2020), the relative advantage of innovation is related positively and significantly to adoption to innovation. After referring to these and other related researches the researcher develops the first hypothesis.

H_1: *The relative advantage of online electric bill payment positively and significantly affects its adoption.*

Simplicity: Is the degree to which an innovation is perceived as relatively easy to use and understand (Rogers, 2003). Innovations that are perceived as more complex are less likely to be adopted. Easy to use in the context of this study refers to a customer do not need to expend significant effort in using online electric bill payment system due to easy to use and measured by three (3) items, which measure the degree of easiness (simplicity) to understand and use, to remember the steps and procedures to be followed. Besides, the extent it takes less effort to make electric bill payment as compared to the traditional system.

Studies made by Abebe & Lessa (2020) and Widayat et al. (2020) found that simplicity (ease to use) has a significant and positive effect on the adoption of mobile money and e-

money respectively. By using these and other researches as a reference, the researcher developed the second hypothesis.

H_2: *The simplicity of online electric bill payment positively and significantly affects its adoption.*

Compatibility: Is the degree to which an innovation fits the values, previous experiences, and needs of the potential adopter (Rogers, 2003). Compatibility in this study context is that customers perceive online electric bill payment system as compatible with their lifestyle and preferences, beliefs, values, and experiences; and measured by three (3) items that, measure the degree of compatibility with their work aspect, behaviour and attitude and living style.

The study made by He et al. (2006), Chandrasekar & Taye (2017), Kaur et al. (2020), and Melka (2017) identified a significant and positive relationship between compatibility and the adoption of innovation. By using these and other researches as a reference, the researcher developed the third hypothesis on the relationship between compatibility and adoption of online electric bill payments.

H_3: *The compatibility of online electric bill payment positively and significantly affects its adoption.*

Observability: Is the degree to which the results of an innovation are visible to others and the benefits can be easily observed and communicated. The results of some ideas are easily, observed and communicated to others whereas some innovations are difficult to describe to others (Rogers, 2003). In the context of this study observability refers to the degree to which customer believes that they can able to conceptualize and communicate (tell) to others about online electric bill payment system and its potential benefits they realized; and measured by three (3) items, which measure the extent to which benefits are apparent to users.

The finding of study made by Al-Jabri & Sohail (2012), Chandrasekar & Taye (2017) and Melka (2017) showed that the observability of an innovation is positively related to its rate of adoption. Accordingly, the researcher develops the fourth hypothesis as follows.

H_4: *The observability of online electric bill payment positively and significantly affects its adoption.*

Trialability: Is the degree to which an innovation may be experimented with in a limited basis (Rogers, 2003). Innovations that can be tried before adoption are adopted more rapidly than those that cannot, especially among those who adopt earlier relative to the majority of potential adopters. In the context of this study, trialability refers to the degree to which that customer believes that technical infrastructure exists to support the adoption of online electric bill payment system; and measured by three (3) items of customers being able to properly try out; and use on a trial basis long enough to see what it can do. As well as having the chance to see others using new technology or being able to try out before deciding whether they like it or not.

Trialability has been used in a wide variety of diffusion studies. A study by Chandrasekar & Taye (2017) and Melka (2017) using DOI as their theoretical foundation, found that trialability positively impacted the adoption of ATM and the adoption of online payment systems. Accordingly, the researcher develops the fifth hypothesis as follows.

H_5: *The trialability of online electric bill payment positively and significantly affects its adoption.*

Socio-Demographic Factors

The traditional innovation diffusion studies Rogers (2003) reveals that earlier adopters of technological innovations are typically younger in age, having higher incomes, better educated, and having higher social status and occupation.

Age: Previous studies show that the tendency of younger consumers' intention to use technological innovations is much higher than that of old consumers. This may be mostly due to the familiarity of internet-based activities at an early stage. As (Mutengezanwa & Mauchi, 2013) noted that older customers are found to have negative attitudes towards technology whilst the younger adults are seen to be more interested in using technology and innovation. In the context of this study, age refers to the age of respondents and measured as a continuous variable.

According to the result of a study, made by (Haile, 2015) age is identified as a significant factor for the adoption of mobile banking. Besides this, the result of a studies made by Mutengezanwa & Mauchi (2013), Serener (2016) and Abayomi et al. (2019), reveals the negative effect of Age of respondents on the adoption of Internet banking and mobile banking. Accordingly, the researcher develops the sixth hypothesis as follows.

H_6: *Age has a negative and significant effect on the adoption of online electric bill payment.*

Income: Rogers (2003) argued that demographic attributes play an important role in predicting adoption and that economic status (income) is highly correlated to initial adoption. Rogers, in his DOI theory proposes that new technologies are initially adopted by those who have more resources. In the context of this study, income refers to the estimated monthly income of respondents measured as a categorical variable.

According to the result of the study made by Gofe & Tulu (2019) among the demographic related factors customer's income level has positively influenced their E-payment utilization activities, and also the result of a study made by Abayomi et al. (2019) revealed the positive effect of income on the adoption of mobile banking. Furthermore, the result of studies made by Mutengezanwa & Mauchi (2013), Ong'wen (2012) and Serener (2016) also confirmed that higher income clients are more likely to use Internet banking. Thus, with reference to the above findings income is posited as follows.

H_7: *Higher income individuals are more likely to adopt online electric bill payment.*

Educational status: Previous studies discovered that the level of education is the strongest positive factor that influences the adoption of new technology. In the context of this study, educational status means the highest level of respondents educational attainment measured as categorical variable.

In Cyprus Serener (2016) showed that respondents with master's or PhD degrees were more likely to adopt internet banking compared to primary and secondary school graduates. In line with this the finding of the study made by Gofe & Tulu (2019), shows that among the demographic related factors, customer's education level has positively influenced their E-payment utilization in the context Ethiopia. Thus, with reference to the above findings the researcher develops the eighth hypothesis as follows.

H_8: *Educated individuals are more likely to adopt online electric bill payment.*

Employment Status: In the context of this study, employment status means the employment status of respondents as to whether employed or unemployed measured as categorical variable. Previous studies Ong'wen (2012), Izogo et al. (2012), Mutengezanwa & Mauchi (2013) and Haile (2015) show that employment (occupational) has significant relation with customer adoption of electronic banking and mobile banking where those who are employed and have better jobs are more likely to adopt internet banking and

mobile banking. Thus, with reference to the above findings the researcher develops the subsequent hypothesis as follows.

H_9: *Employed individuals are more likely to adopt online electric bill payment.*

Customer Type: In organizational setting, customers can be larger corporations, in which a type of decision-making can be expected prior to adoption that involves individuals from different departments and with different disciplinary backgrounds. Thus, the decision making process prior to adoption becomes an entirely different process in which decision-makers and adopters are often not the same individuals. Moreover, this situation calls for an entirely different approach including adapted evaluation criteria and adoption process stages, as compared to cases involving individual decision makers that adopt themselves. Therefore, the adoption of an innovation may take an extended period in organizational setting. In this study, customer type means the customers of EEU measured as a categorical variable whether respondents are household customers or organizational customers (Commercial customers and Industrial customers). In this study, the researcher tries to assess how these customers give respond to innovations.

Bharadwaj & Baruah (2018) were assessed the usage pattern of the digital payment of electric bill among customers in India and they found that that 72.78%, 78.57% and 48.48% of household, commercial and industrial consumers used e-payment system. From this, it can be seen that on average household consumers have greater interest towards this system than organizational customers (i.e., commercial consumers and industrial consumers) have. Thus, in order to have more clarity on the effect of this attribute, it has been posited as follows.

H_{10}: *Household customers are more likely to adopt online electric bill payment.*

Table 3-2: Summary of Variable Measurement and Definition

Variables	Symbols	Measurement of scale
Adoption of online electric bill payment	AOP	0= never used
		1= used at least once
Relative Advantage of an innovation	RA	Likert questionnaire
Compatibility of an innovation	COMP	Likert questionnaire
The simplicity of an innovation	SIM	Likert questionnaire
Trialability of innovation	TR	Likert questionnaire
Observability of innovation	OBS	Likert questionnaire
Age of respondent	AGE	Age in years
Educational level of the respondent	EDUC	1= PhD
		2= Masters
		3= Degree
		4= TVET & Diploma
		5= Secondary School
		6= Primary School
Income level of the respondent	INCOME	1= Above 10,000
		2= 5,000 –10,000
		3= 1,000 – 5,000
		4= Less than 1,000
Employment status of the respondent	EMPLOY	0= Unemployed
		1= Employed
Customer type	TYP	1= Household (Domestic)
		2 = Organization

Source: Researcher own construction

Based on the proposed research model the summary of research hypotheses are:-

H_1: *The relative advantage of online electric bill payment positively and significantly affects its adoption.*

H_2: *The simplicity of online electric bill payment positively and significantly affects its adoption.*

H_3: *The compatibility of online electric bill payment positively and significantly affects its adoption.*

H_4: *The observability of online electric bill payment positively and significantly affects its adoption.*

H_5: *The trialability of online electric bill payment positively and significantly affects its adoption.*

H_6: *Age has a negative and significant effect on the adoption of online electric bill payment.*

H_7: *Higher income individuals are more likely to adopt online electric bill payment.*

H_8: *Educated individuals are more likely to adopt online electric bill payment.*

H_9: *Employed individuals are more likely to adopt online electric bill payment.*

H_{10}: *Domestic customers are more likely to adopt online electric bill payment.*

3.8. Data Analysis Technique

Once the data necessary for the study has properly collected and the collected questionnaires checked for completeness; then verification and editing conducted and the questions organized in such a way as to facilitate the analysis of the study. After the data organized in this way it has entered into database prepared using SPSS software. Then, to make ready for the analysis, data entered is re-edited. Finally, after all the necessary primary data preparation tasks were performed, the data analysis process was carried out in clear way to reach the objective of the study using both qualitative and quantitative means of analysis.

Data concerning the respondents' demographic and organizational variables, electric bill payment practice and its associated problems, and the benefits and challenges of online electric bill payment were analysed descriptively by using descriptive statistical analysis methods such as frequency, percentage, and average. The result was presented in the form of table, percentages, bar graphs, pie charts and the presented data was also be interpreted to provide detailed conclusions and recommendations.

To see the effect of explanatory or independent variables on the dependent variable both descriptive statistics and inferential statistics are used. The descriptive statistics parts of the variables analysed by using maximum, minimum, means, standard deviation, and percentage. In addition, tools for the test of hypothesis and measures of association, such as bivariate analysis used in the study and specifically Binary logistic regression analysis conducted. The researcher used SPSS version 20 to analyse the collected data and statistical results from the software has presented in the form of tables, and interpreted to discuss the effect of independent variables on the dependent variable.

3.9. Model Specification

In this study, the researcher used binary Logistic regression model, which is an extension of simple linear regression where the dependent variable is dichotomous or binary; we cannot use simple linear regression. Logistic regression is that of a statistical technique used to predict the construction between predictors (our independent variables) and a predicted (dependent variable). Therefore using logistic regression this study estimates the probability of a dichotomous response for various values of explanatory variables. Accordingly, the logistic regression function is given by:

$P(Y) = log = \frac{p}{1-p} = \beta 0 + \beta 1X1 + \beta 2X2 + \cdots \beta nXn + \varepsilon i$. Moreover, this results in:

$$P(Y) = \frac{e\beta o + \beta 1X1 + \beta 2X2 + \cdots \beta nXn + \varepsilon i}{1 + e\beta 0 + \beta 1X1 + \beta 2X2 + \cdots \beta nXn + \varepsilon i}$$

Where: P = Probability of the occurrence of success

Y = Dependent variable

Xn =Independent variables that influence the probabilities of the outcome of the dependent variable

e = Natural logarithm base

β0 = Interception at the Y-axis

βn = Coefficients of the explanatory variables

εi = Stochastic disturbance or error term and Then this are rewritten as follows:

$lan = \frac{p}{1-p}$= β0 + β_1RA+ β_2COMP+ β_3SIM+ β_4TR+ β_5OBS+ β_6AG+ β_7EDUC + β_8INC+ β_9EMPLOY +β_{10}TYPC+ εi

Where: P=probability of the rate of adaptation of innovation

Y= rate of adaptation of innovation

β0= constant of the logistic regression equation

RA=Relative advantage of innovation

COMP=Compatibility of an innovation

SIM=Simplicity

TR=Trialability of an innovation

OBS=Observability of an innovation

AG=age of respondent

EDUC= education status of the respondent

INCOME=income level of respondent

Employ= Employments status

TYPC= Types of customers

3.10.The Reliability of the Questionnaire Items

In this research, Cronbach's alpha has used to test the reliability of the items included in the questionnaire. Hair et al. (2010) suggested that coefficients of Cronbach's alpha greater than 0.70 are considered to be reliable indicators of the constructs under study. Therefore, in this study first 15 Questions tested to check the reliability of the questioner. As shown below in Table 3-3 all main variables are above the minimum threshold of 0.70.

Table 3-3: Cronbach's Alpha Coefficient of the Research Items

Variables	Cronbach's Alpha	N of Items
Simplicity	.875	3
Trialability	.716	3
Relative Advantage	.906	3
Compatibility	.953	3
Observability	.733	3

Source: survey 2021

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This chapter deals with the presentation, analysis, discussion, and interpretation of the results of the study. The chapter has the following main sections; demographic characteristics of respondents, electric bill payment practices, obstructions in electric bill payment, descriptive statistics and binary logistic regression analysis for the overall model and rate of adoption of online bill payment were presented and discussed under this chapter.

4.1. Respondents Characteristics

This section gives a brief overview of the demographic characteristics of the respondents, such as customer type, employment status, gender, age, level of education and income are considered and the summary of study participant's demographic information is shown in Table 4-1.

As shown in Table 4-1; first, the study sought to summarizes the three categories of electricity consumers (i.e., individual consumers, industrial consumers and commercial consumers) in two groups as household and organizational based on the service type that respondents have subscribed with EEU. The result shows that most (71%) of respondents use electricity for household purpose whereas only (29%) of the respondents use electricity either for commercial and industrial activities. The gender distribution of respondents is heavily skewed on the male side, where 68.9% were male and only 31.1% were female, from this it can be easily understood that males have dominated the respondents' gender distribution. In terms of age, most (45.4%) of the respondents are between the age of 31 and 40, while respondents in their young ages (i.e., less than 30) recorded the lowest percentage (9.2%).

As indicated by the Table 4-1, the highest number of respondents had completed primary school (35.3%), followed by those who had completed secondary school (30.7%), followed by TVET and diploma holders (16%), followed by those who had bachelor degree (13.4%) and then followed by masters of degree holders (4.6%). Generally, the qualifications of the respondents in terms of their level of education showed that only 34% of respondents had a university or college certificate (i.e., TVET, diploma, bachelor degree and masters of degree certificates) while the remaining above majorities (66%) of the

respondent had completed either primary or secondary school with the same level of education. With regard to the employment status of respondents, the study revealed that majority (75.6%) of the respondents was unemployed as compared to 24.4% who were employed. Finally, the estimated monthly income level of the respondents assessed and the result was as displayed in Table 4-1. Accordingly although the income distribution of the respondents cover a wide range of income groups where 46.2% fall within income level of 1,001 to 5,000 ETH birr, 26.5% within income level between 0 and 1,000 ETH birr, 23.1% within income level between 5,001 to 10,000 ETH birr and 4.2% in the above 10,000 ETH birr. Thus, majority of the respondents had a monthly income of 0-5,000 ETH birr (72.2%).

Table 4-1: Summary of Respondents Demographic Characteristics

Variables	Category	Frequency	Percentage
Customer Type	Household	169	71.0
	Organization	69	29.0
	Total	**238**	**100.0**
Gender	Male	164	68.9
	Female	74	31.1
	Total	**238**	**100.0**
Age	Less than 30	22	9.2
	31.00 - 40.00	108	45.4
	41.00 - 50.00	33	13.9
	51.00 - 54.00	48	20.2
	Above 55.00	27	11.3
	Total	**238**	**100.0**
Level of Education	Masters	11	4.6
	Degree	32	13.4
	TVET & Diploma	38	16.0
	Secondary	73	30.7
	Primary	84	35.3
	Total	**238**	**100.0**
Employment Status	Not employed	180	75.6
	Employed	58	24.4
	Total	**238**	**100.0**
Monthly Income Level	Above 10,000	10	4.2
	5,000 – 10,000	55	23.1
	1,000 – 5,000	110	46.2
	Less than 1,000	63	26.5
	Total	**238**	**100.0**

(Source: Researcher's survey, 2021)

4.2. Electric Bill Payment Practice

Under this section the study present the summary of key findings on the data collected associated with the practice of electric bill payments. For better understanding, the collected data are simply presented in the form of tables, diagram and charts. Interpretation of the data is also given to share the meaningful information. The data collected include the average monthly electric bill, distance from CSC, average time to pay the bill, frequency of meter reading, responsible person to pay bill, electric consuming devices at home or organization, method of electric bill payment, the reason for selecting traditional method, and benefit customers gate from being a user of online electric bill payment system. Therefore, the information enabled the researcher to have a better understanding of the most preferred mode of payment by clients, attitude of clients toward the cash-base payments to electronic payments, and factors influencing clients to use e-payment system.

4.2.1. Average Monthly Electric Bill

Regardless to the type of customers, the minimum expenditure for electricity was 70 ETH birr while the maximum was 1800 ETH birr and the mean of monthly electric bill was about 328 ETH birr as shown below in Table 4-2.

Table 4-2: Average Monthly Electric Bill, Distance from CSC, and Time to Pay Bill

	N	Minimum	Maximum	Mean	Std. Deviation
Average monthly electric bill	238	70	1800	327.86	279.26
Distance from CSC in minutes	238	3	72	25.79	17.92
Average time to pay bill in minutes	238	10	240	77.77	57.84
Valid N (listwise)	**238**				

(Source: Researcher's survey, 2021)

4.2.2. Distance from Customer Service Center

With regard to the distance from CSC, respondents were asked to state the average walking time taken to travel when they go to customer service center to pay their bill. As indicated in the above Table 4-2, the average distance from customer service center measured by walking distance was almost 26 minutes with a standard deviation of 17.92 minutes that indicated the dispersion of minimum 3 minutes and maximum 72 minutes from the mean.

4.2.3. Average time to Pay Bill

In addition, respondents were asked to disclose the average waiting time in order to pay their electric bill. Results reveal the average time to pay bill measured by minutes was 78 minutes that ranges between a minimum of 10 minutes and maximum of 240 minutes with a standard deviation of 57.84 minutes as shown in Table 4-2.

4.2.4. Frequency of Meter Reading

Figure 4-1 below shows a graphical display of the frequency of meter reading, as it can be realized that 79% of the respondents states that the frequency with which meter readers has coming is irregular and the remaining 21% states that meter readers were coming monthly. While the metering and billing cycle of EEU is on a monthly basis, only 21% of the respondents are being metered monthly thus most of the respondents will pay above or below their actual consumption of electricity since metering and billing cycle are not synchronized.

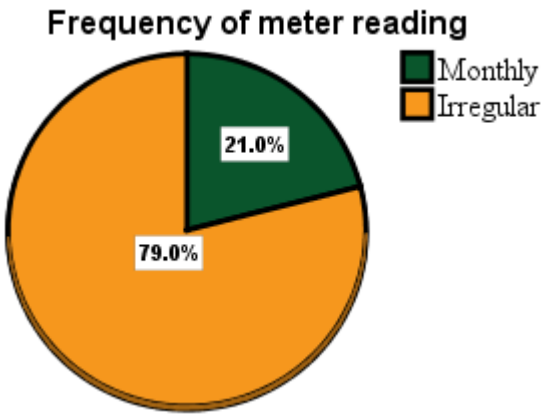

Figure 4-1: Frequency of Meter Reading

(Source: Researcher's survey, 2021)

4.2.5. Bill payment responsibility

To understand the distribution of bill payment responsibilities among family members' respondents were asked to indicate the person who is responsible for paying bill of electric consumption at home or organisation and the result is as shown below in Figure 4-2. Accordingly out of the total 238 respondents 119 (50%) of them stated that husband has the responsibility to pay their electric bill, 92 (38.7%) of them stated that wife has the responsibility to pay their electric bill, and 52 (21.8%) stated that children is responsible.

From this, it can be conclude that the majority of male household head takes responsibility to pay electricity bill rather than female household head and their children.

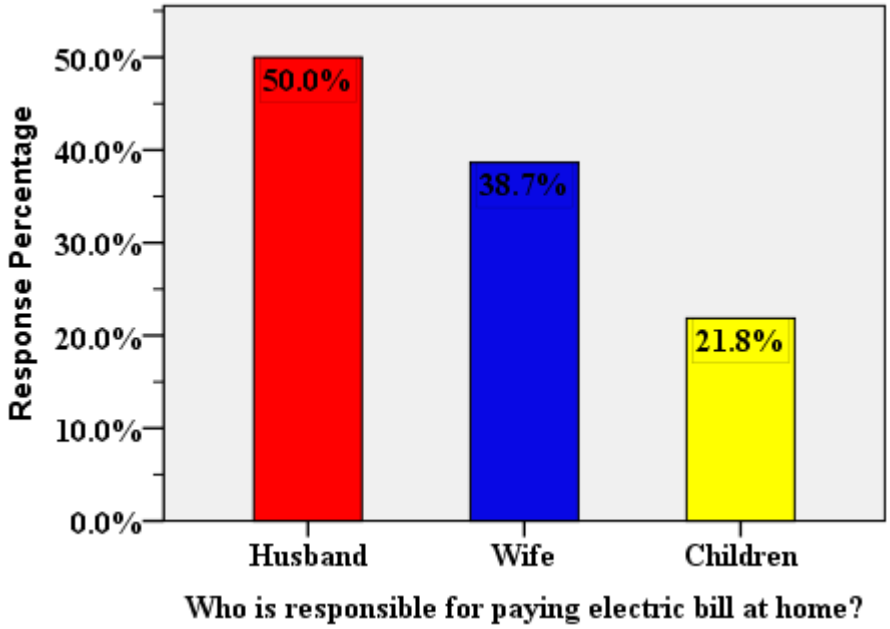

Figure 4-2: Bill payment responsibility

(Source: Researcher's survey, 2021)

4.2.6. Purpose of Electricity

This section of the study was aimed at establishing the customers' purpose for electricity in terms of a diverse set of electric consuming devises used in their home and work area.

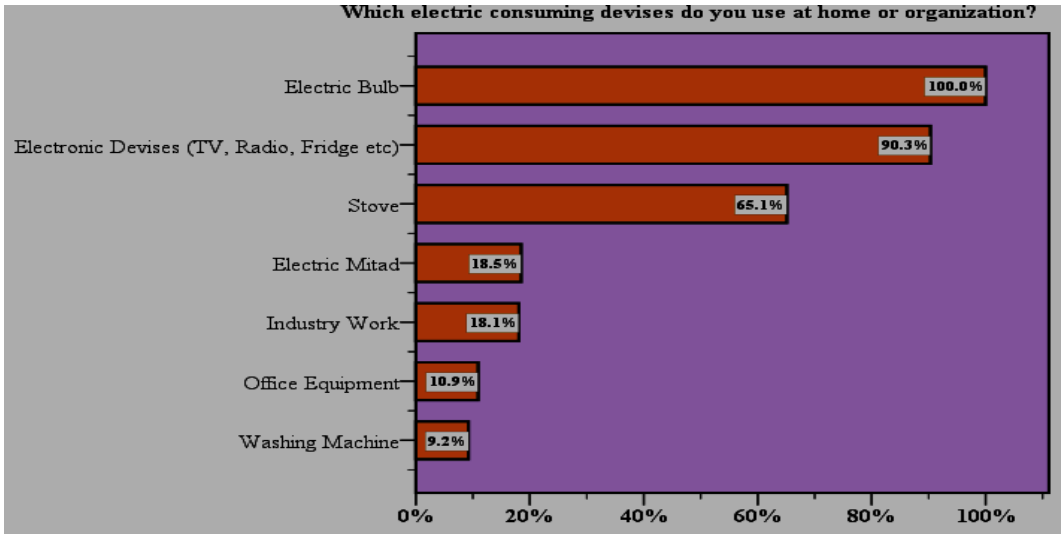

Figure 4-3: Purpose of Electricity

(Source: Researcher's survey, 2021)

As showed in the above Figure 4-3 all of the respondents use Electric bulb, followed by 90.3% Electronic devices (TV, Radio, Fridge, etc.), 65.1% Stove and 18.5% Electric Mitad, whereas 18.1%, 10.9% and 9.2% of the total respondents said that they use electricity for Industry work, Office equipment and Washing machine respectively. Thus, the respondents' use of electricity is primary for lighting, electronic appliances and cooking purpose.

4.2.7. Method of Electric Bill payment

In order to understand the customers' preferences among the alternative methods of bill payment respondents were asked to indicate how they pay their monthly electricity bills and the result was as shown below in Figure 4-4. The finding reveals two out of three (66%) and seven out of twenty (35%) respondents are paid through cash at CSC and at CBE in person respectively, whereas respondents paid through nearby agent CBE birr, using own CBE birr and Internet banking have 14%, 13% and 2% share respectively, however no one has paid through direct debit standing instruction. From this, it can be realised that most 178 (74.8%) of respondents paid their electric through traditional cash basis (conventional) payment methods which means three out of four respondents conduct bill payment at CSC and/or CBE by appearing in person. On the other hand, only 60 (25.2%) of the respondents are paid through online (electronic) bill payment method. In general, we can see from the results of the study that the new online bill payment systems employed by the EEU are not being well used by the customers.

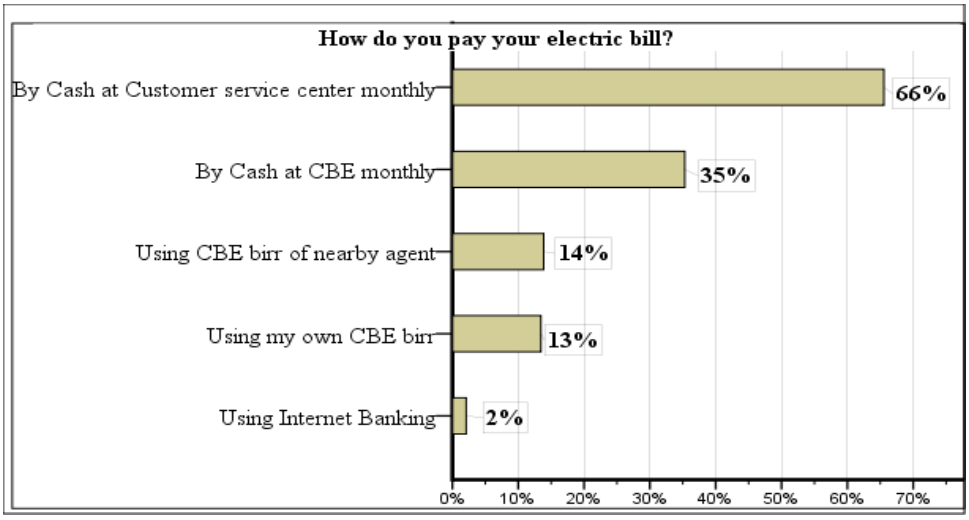

Figure 4-4: Method of electric bill payment

(Source: Researcher's survey, 2021)

4.2.8. Reasons for Non-Adoption of Online Bill Payment Methods

In order to understand the reasons why customers have not used online bill payment method rather than keep to use the traditional cash basis method of bill payment, respondents were asked to give their reasons.

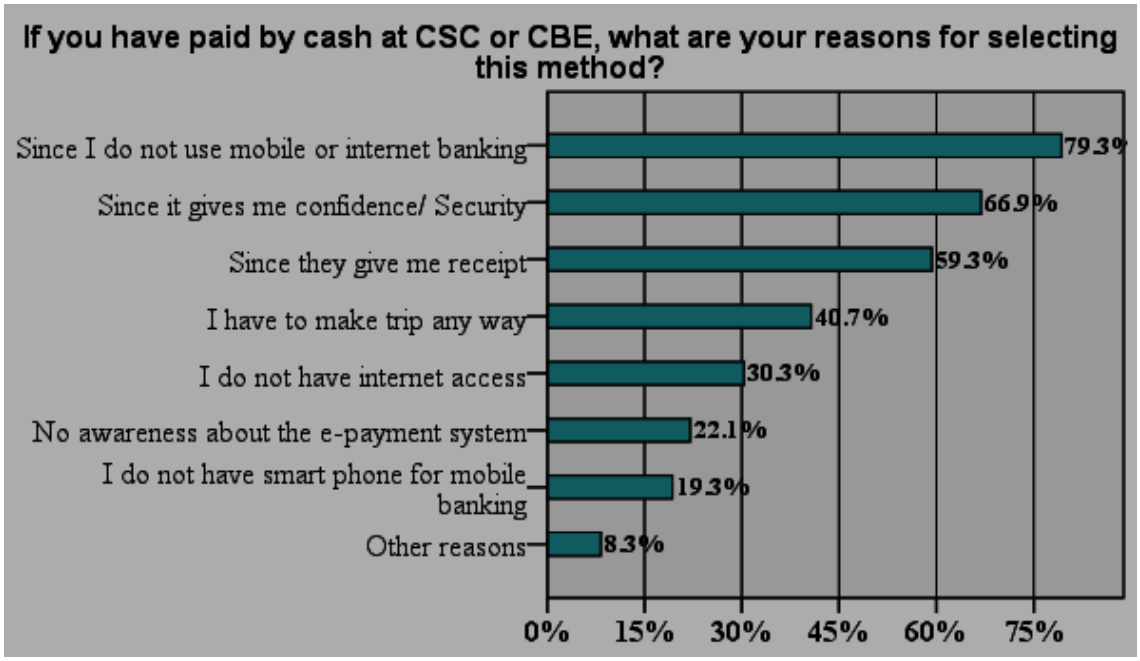

Figure 4-5: Reasons for selecting a traditional electric bill payment method

(Source: Researcher's survey, 2021)

As shown above in Figure 4-5 out of 178 respondents who had never paid through online method most of them reasoned out that since; they are not being a user of mobile or internet banking (79.3%), the traditional method gives them confidence or security (66.9%) and the traditional method give them receipt (59.3%). In addition, the need to make trip any way to CSC, having no or poor internet access and lack of awareness about the existence of online payment system as a payment option or how it work are reasons for continuing to pay through traditional methods as identified by (40.7%), (30.3%) and (22.1%) of those respondents respectively. Whereas almost one in five (19.3%) of the respondents continued to pay their electric bill through traditional method because they do not have smart phone for mobile banking.

In addition to those reasons, some of the respondents mentioned that they know individuals that faced problem by using online bill payment method; they fear the risk of

payment may go to wrong account; and losing payment receipt (documents) if they lost their Mobil.

4.2.9. Benefits of Online Bill Payment Methods

To identify the benefits of using online electric bill payment methods respondents asked to indicate the benefits they realized by paying their monthly electric bill through online method and the result is shown below in Figure 4-6 as indicated by the respondents.

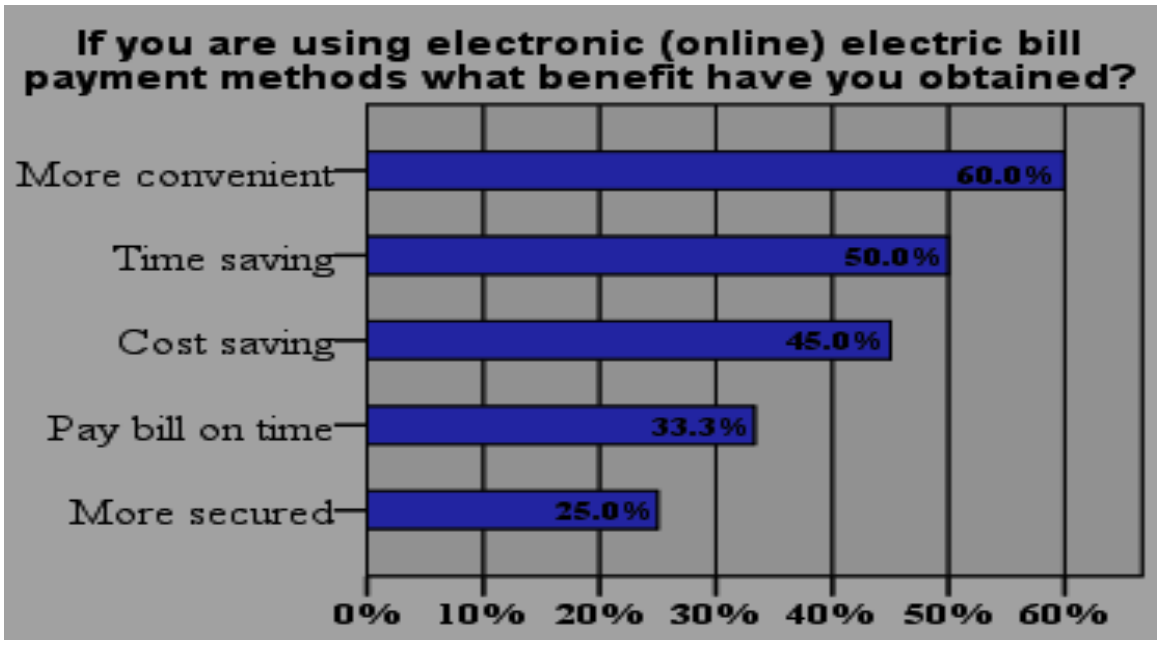

Figure 4-6: Benefit of using online electric bill payment methods

(Source: Researcher's survey, 2021)

Based on the result, out of those 60 respondents who paid their monthly electric bill through online most (60%) of them cite convenience as the benefit of using online bill payment, while time saving and cost saving were cited by 50% and 40% of those surveyed respectively. In addition, one third of the respondents stated online bill payment enables them pay their bill on time whereas only 25% of them stated that it is more secured.

Therefore, the primary advantages of online bill payment perceived by the respondents are the ability to pay electric bill independence of time and place (i.e., from anywhere at any time), reducing the time required to travel and queuing and saving monitory expenses associated with transportation cost and penalty imposed on delayed payment.

4.3. Challenges of Electric Bill Payment

This section of the study sought to identify the challenges faced by respondent associated with meter reading and bill payment, the impact of COVID 19 in electric bill payment and the factors that hindering respondents from being a pre-paid customer.

4.3.1. Challenges in Meter Reading

As shown below in Figure 4-7 among the problems related to meter reading the most prevalent one is not-regularly (monthly) coming of meter readers, followed by unwillingness to correct meter reading error as indicated by about (84%) and (43%) of the total respondents respectively. Meter having technical problem and not timely fixing (repairing) damaged meter are indicated by (16%) and (14.2%) of the respondents respectively where as one out of ten (11%) respondents stated that they are not getting meter on time from EEU. In addition to those problems, some of the respondents stated that meter readers are not transparent, give any information, and advises about their electric consumption.

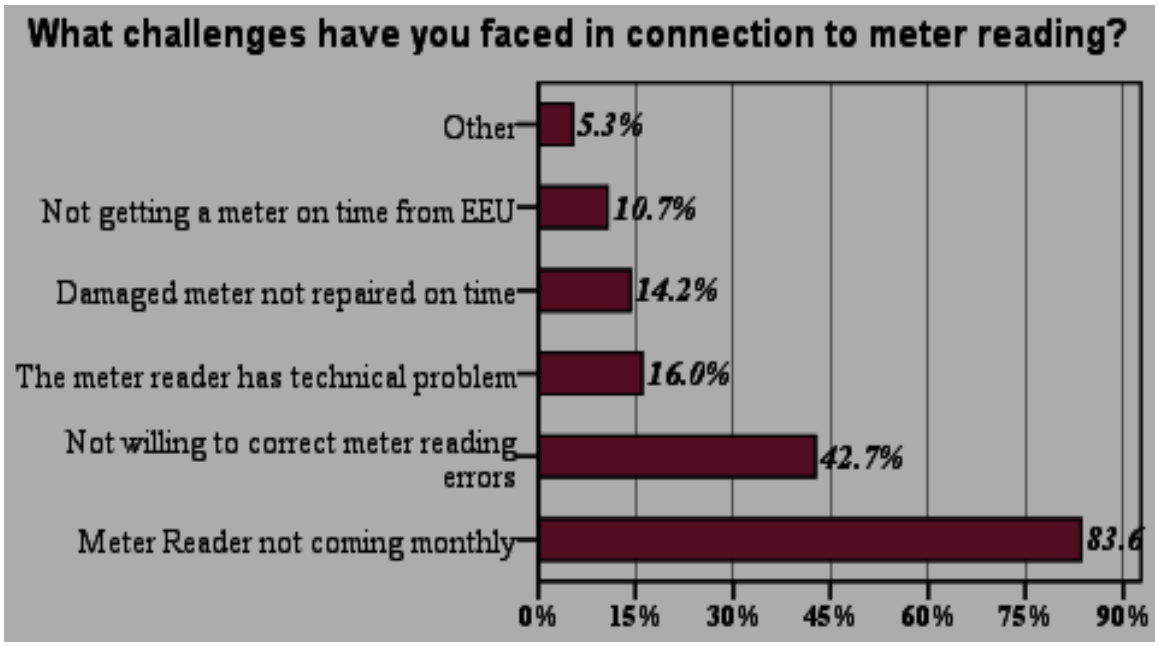

Figure 4-7: Challenges in Meter Reading

(Source: Researcher's survey, 2021)

4.3.2. Challenges of Electric Bill Payment in Traditional (cash basis) Methods

To identify major problems of electric bill payment under the traditional method respondents were asked to indicate the challenges that they are faced when they pay monthly electric bill by cash at CSC or at CBE.

As shown below in Figure 4-8; queuing (waiting) for a long time to make payment is the most common problem as reported by 82.5% the respondents, followed by not-timely entering of electric consumption for billing 65.6%, exaggerated bill amount 45% and inconvenience of payment system 31.9%. In contrast to these, 25%, 12.5% and 7.5% of the respondents stated that the cash collectors are not ethical, they are not given a grace period for large payment and they are disconnected from electric line due to delay in payment respectively

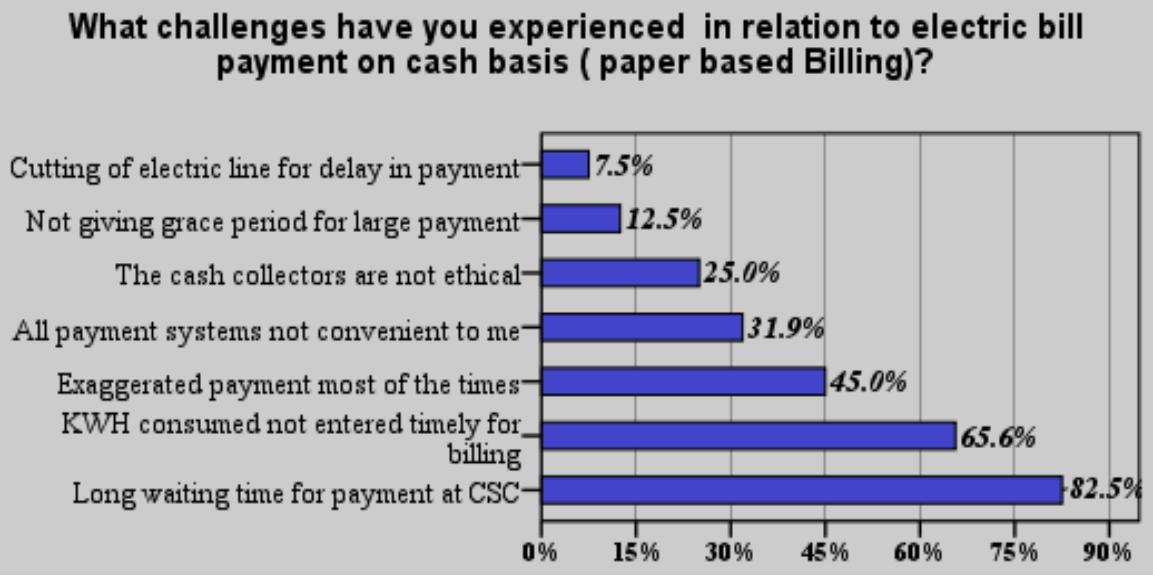

Figure 4-8: Challenges of Electric Bill Payment in Traditional Method

(Source: Researcher's survey, 2021)

4.3.3. Challenges of Electric Bill Payment through Online Methods

To find out the challenges of online method electric bill payment respondents were asked to indicate the challenges they experienced, when paying their monthly electric bill through online and the study revealed that lack of synchronization, interruption of internet connection and non-availability of CBE birr agents in close destination are the main challenges as shown below in Figure 4-9.

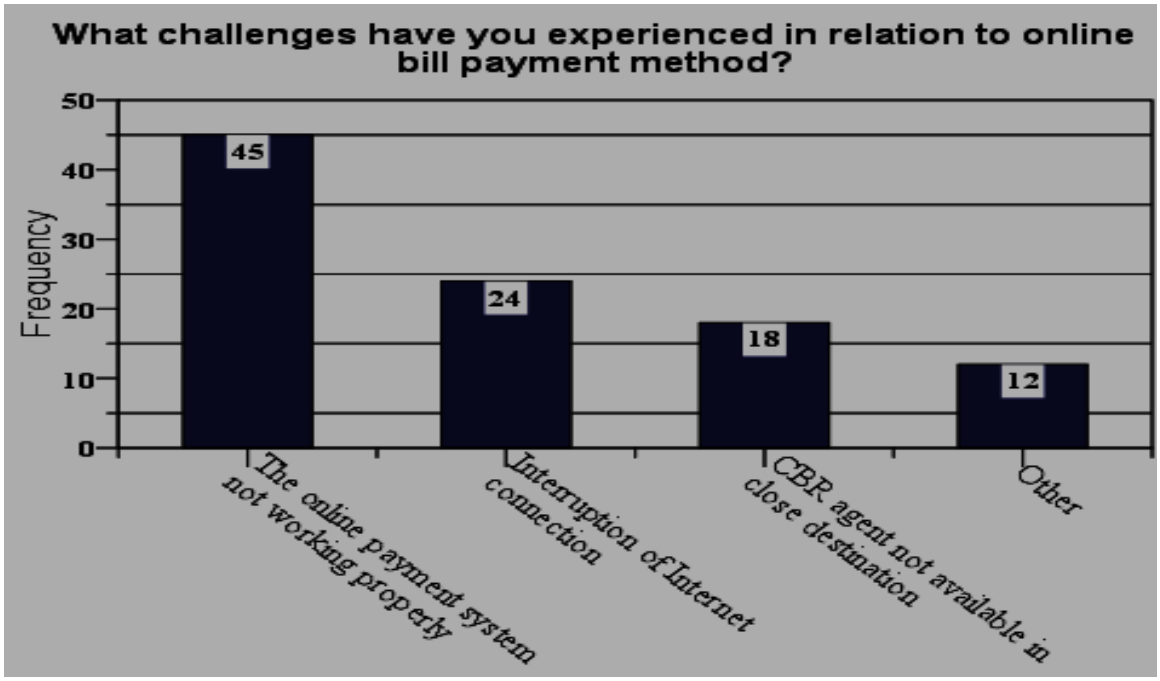

Figure 4-9: Challenges of Online Electric Bill Payment

(Source: Researcher's survey, 2021)

Based on the result out of 60 respondents paid through online method 45 (75%) of them reported that the system is not working properly, 24 (40%) of them reported that the internet connection is not inefficient and 18 (30%) of them reported that CBE birr agents are not available in their close destination. Furthermore, the problem of not timely entering of electric consumption, balance brought forward (negative bill amount) and delayed reconciliation were reported by the respondents.

4.3.4. Factor that Prevented Customers from Being a Prepaid Card User

Under this sub-section, the researcher tries to assess the constraints that prevented customers of EEU from being a prepaid card user and the result was as shown below in Figure 4-10. Accordingly, not easily availability of the prepaid card is the most common barrier of adopting prepaid meter as reported by 96 (40%) the respondents. Whereas unwillingness of EEU to make the change to a prepaid card and high cost of installing prepaid card were also revealed as hindrance to use prepaid meter as indicated by (25.2%) and (20.4%) of the respondents respectively. In addition to this, as indicated by some of the respondents the reason for not adopting prepaid meter is due frustration and lack confidence in the prepaid meter based on their historical relationship with EEU.

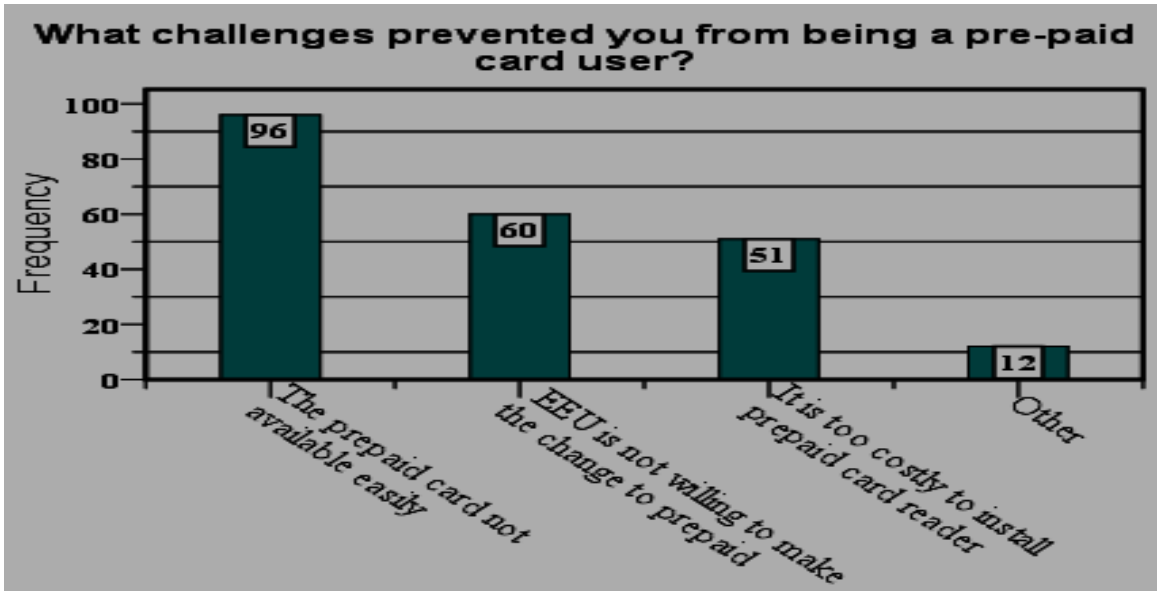

Figure 4-10: Factor that prevented customers from being a pre-paid card user

(Source: Researcher's survey, 2021)

4.3.5. Effect of COVID 19 in Electric Bill Payment

As citizens were required to stay at home and cutting down of economic activity during the COVID 19 emergency and stay-at-home order passed to limit the spread of COVID-19 has reduced their income and due to this almost 40% of the respondents were unable to pay electric bill. Whereas, as indicated by about 10% of the respondents the existence of COVID 19 encourage them to use online bill payment system to avoid the risk of exposure to COVID 19. Furthermore, some respondents added that COVID 19 was made difficult to file a complaint and gate quick responses due to lockdown.

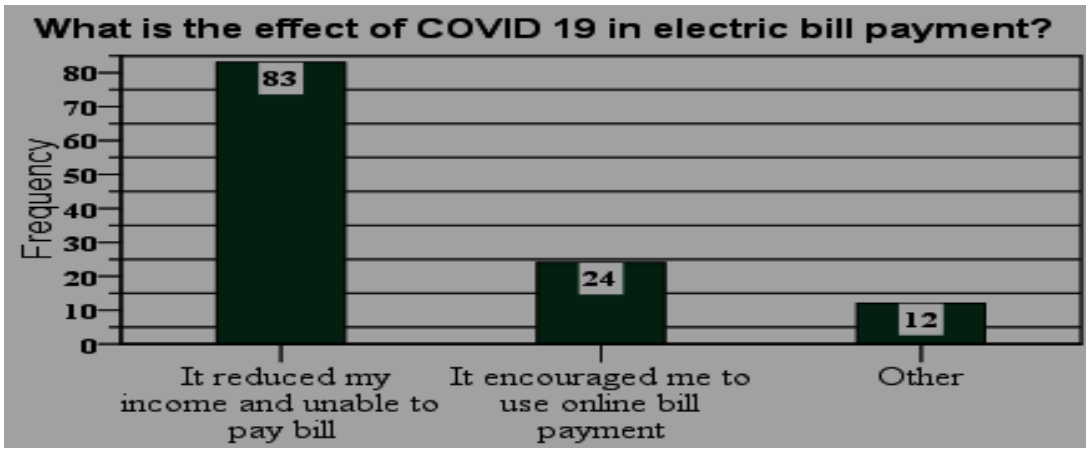

Figure 4-11: The effect of COVID 19 in electric bill payment

(Source: Researcher's survey, 2021)

4.4. Descriptive Statistics

This section presents the descriptive statistics of the dependent and independent variables used in this study. The dependent variable used in this study was the adoption of online bill payment system while the independent variables are simplicity, trialability, compatibility, observability, and relative advantage, type of customer, employment status, age, educational level, and monthly income. Accordingly, in the following two subsections a separate comparison of adopters and non-adopters of online bill payment system was carried out for both categorical and continuous variables to see the pattern of association between the dependent variable and the independent variables.

4.4.1. Descriptive Statistics of Categorical Variables

Hereunder to see whether the distribution of the outcome variable varies across demographic characteristics of the respondents four categorical variables were examined using custom table procedure and the result shows that out of the total 238 respondents there were 178 (74.8%) non-adopters and only 60 (25.2%) adopters of online bill payment system as seen below in Table 4-3. Accordingly, as the mean of adopting online bill payment system is the proportion of adopters to the overall sample of respondents and it can be interpreted as a probability. Therefore, the probability of adopting online bill payment system in our sample is 0.252. In addition, the unconditional odds (i.e., odds of the sample as a whole) that shows the likelihood of an event occurring (i.e., adopting online bill payment system) relative to the likelihood of an event not occurring (i.e., not adopting online bill payment system) of the whole sample is 0.34 (60/178). This means, if any respondents are randomly chosen from the sample they are 0.34 times more likely to adopt online bill payment system than not to adopt online bill payment system.

As shown in Table 4-3, there is no clear difference related to the type of customer where 25.4% and 24.6% of household customers and organizational customers adopting online bill payment system respectively with a percentage difference of less than one (i.e., 25.4% - 24.6% = 0.8%). However, there is a big more variance related to employment status with 70.7% of employed respondents adopting online bill payment system compared to 10.6% of unemployed respondents. This indicates that the percentage of employed respondents who adopt online bill payment system is 60.1% greater than the percentage of unemployed respondents who adopt online bill payment system (because 70.7% - 10.6% = 60.1%).

Table 4-3: Descriptive Statistics Result of AOP by Categorical Variables

Variables	Category		Adoption of online payment			Statistics	
			Cash	Online	Total	Odds	OR
Customer Type	Household	Count	126	43	169	0.34	1.04
		Row %	74.6%	25.4%	100%		
	Organization	Count	52	17	69	0.33	Base
		Row %	75.4%	24.6%	100%		
	Total	**Count**	**178**	**60**	**238**	**0.34**	**-**
		Row %	**74.8%**	**25.2%**	**100%**		
Employment Status	Not employed	Count	161	19	180	0.12	Base
		Row %	89.4%	10.6%	100%		
	Employed	Count	17	41	58	2.41	20.44
		Row %	29.3%	70.7%	100%		
	Total	**Count**	**178**	**60**	**238**	**0.34**	**-**
		Row %	**74.8%**	**25.2%**	**100%**		
Educational Level	Masters	Count	9	2	11	0.22	6.00
		Row %	81.8%	18.2%	100%		
	Degree	Count	9	23	32	2.56	69.00
		Row %	28.1%	71.9%	100%		
	TVET & Diploma	Count	21	17	38	0.81	21.86
		Row %	55.3%	44.7%	100%		
	Secondary	Count	58	15	73	0.26	6.98
		Row %	79.5%	20.5%	100%		
	Primary	Count	81	3	84	0.04	Base
		Row %	96.4%	3.6%	100%		
	Total	**Count**	**178**	**60**	**238**	**0.34**	**-**
		Row %	**74.8%**	**25.2%**	**100%**		
Monthly Income	Greater than 10,000	Count	7	3	10	0.43	6.32
		Row %	70.0%	30.0%	100%		
	5,000 - 10,000	Count	33	22	55	0.67	9.83
		Row %	60.0%	40.0%	100%		
	1,000 - 5,000	Count	79	31	110	0.39	5.79
		Row %	71.8%	28.2%	100%		
	Less than 1,000	Count	59	4	63	0.07	Base
		Row %	93.7%	6.3%	100%		
	Total	**Count**	**178**	**60**	**238**	**0.34**	**-**
		Row %	**74.8%**	**25.2%**	**100%**		

(Source: Researcher's survey, 2021)

Although it lacks a pattern of linear association and the significance of this apparent difference is subjected to further statistical test, the results of Table 4-3 shows that more

educated and high-income earner respondents adopt online bill payment system more than the lowly educated and low-income earner. The proportion of masters of degree holder respondents adopting online bill payment system is 18.2%. The proportion is substantially higher among respondents who had bachelor of degree (71.9%) and substantially lower among respondents who had completed primary school (3.6%), while the other academic groups falling in between these two extremes. Finlay, the distribution of adoption of online bill payment system according to income level of the respondents revealed a substantial association. Where 6.3% and 28.2% of low-income group respondents who earned less than 1,000 ETH birr and between 1,000 and 5,000 ETH birr adopt online bill payment system respectively, this rises to 30% for respondents from high-income group and 40% for respondents from middle-income group.

Furthermore, in the Table 4-3 the conditional odds and the odds ratios (OR) also disclosed. The conditional odds represent the odds of adopting online bill payment system relative to the proportion of not adopting online bill payment system depending on the condition of categories of the demographics of respondents. Whereas the odds ratios (OR) compares the odds of adopting online bill payment system for a particular category to the base category of the given demographic variable.

4.4.2. Descriptive Statistics of Continuous Variables

Table 4-4: Summary of Descriptive Statistics

Variables	Descriptive Statistics					Adoption of online payment				t-test	
						No (N = 178)		Yes (N =60)		T-value	Sig. (2-tailed)
	N	Min	Max	Mean	S.D	Mean	S.D	Mean	S,D		
AG	238	22	62	41.67	9.15	43.90	9.06	35.05	5.49	9.01	.000
TR	238	1	5	2.44	0.86	2.36	0.91	2.69	0.63	-3.14	.002
OBS	238	1	5	2.56	0.94	2.27	0.82	3.41	0.74	-9.50	.000
SIM	238	1	5	2.86	1.22	2.40	1.03	4.24	0.46	-19.01	.000
RA	238	1	5	3.02	1.34	2.56	1.20	4.39	0.50	-16.52	.000
COMP	238	1	5	2.83	1.39	2.32	1.21	4.34	0.51	-18.01	.000
Valid N (listwise)	**238**										

(Source: Researcher's survey, 2021)

AG=Age, TR=Trialability, OBS=Observability, SIM=simplicity, RA=Relative Advantage, COMP=Compatibility, S.D=Std.Deviation, Min=Minimum, Max=Maximum.

The above Table 4-4 presents summaries of descriptive statistic used to determine the mean scores of continuous independent variables and independent sample T-test used to compare mean scores of continuous scale variables between two groups of adopters and non-adopters of online bill payment system. Thereby, to see whether the perception of adopter and non-adopter groups over the innovation attributes of online bill payment system different and the mean age difference between adopters and non-adopters.

As shown on the descriptive statistic column of Table 4-4 the mean of innovation characteristics variables are almost close to each other where the highest value is for the mean of relative advantage (Std.Deviation=1.34) which is 3.02 and the least is for the mean of trialability (Std.Deviation=0.86) which is 2.44. Whereas the average age of respondents is 41.67 years with standard deviations of (Std.Deviation=9.15) and finally, the result of t-test statistics reveals that, the mean of age and perceived innovation attributes were significantly different between adopters and non-adopters of online bill payment system.

4.5. Inferential Results

Under this section, the test of assumptions of binary logistic regression and the result of binary logistic regression are discussed.

4.5.1. Assumptions of Binary Logistic Regression

This study examined the relationship of adoption online bill payment system with innovation attributes and respondents demographic characteristics where the dependent variable (i.e., adoption of online bill payment system) is measured as binary outcome variable, binary logistic regression model was used to identify the factor that determine the adoption of online bill payment system.

According to Pallant (2005), binary Logistic regression does not make many of the key assumptions of linear regression and general linear models. It does not require a linear relationship between the dependent and independent variables, the error terms (residuals) do not need to be normally distributed, the homoscedasticity is not required and the dependent variable is not measured on an interval or ratio scale. However, some other assumptions still apply which include large sample size and multicollinearity. Binary logistic regression requires little or no multicollinearity among the independent variables or the independent variables should not be too highly correlated with each other.

Therefore, these two assumptions were checked before the binary logistic Regression is run.

4.5.1.1. Sample Size Test

To calculating for sample size requirements for binary logistic regression a formula N > 50 + 8m (where N = sample size and m = the number of independent variables) provided by Tabachnick et al. (2007) that took into account the number of independent variables is employed. In our case, the number of independent variables is 10 and the sample size is 238. Substituting these values into the formula, 238 > (50+8*10) gives 238>130 and thus, the assumption of sample size requirements was met.

4.5.1.2. Multicollinearity Test

According to Brace et al. (2003) multicollinearity is a situation where a high correlation is detected between two or more predictor variables and which cause problems in drawing inferences about the relative contribution of each predictor variable to the success of the model as cited by Kapoor et al. (2017). To diagnose the presence of the multicollinearity problem, VIF (Variance Inflation Factor) which the reciprocal value of the tolerance value is used.

Table 4-5: Multicollinearity Test Result

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Customer Type	.705	1.419
	Employment Status	.508	1.970
	Educational Level	.427	2.343
	Monthly Income Level	.500	2.001
	Age	.821	1.219
	Trialability	.779	1.283
	Observability	.572	1.747
	Simplicity	.282	3.542
	Relative Advantage	.323	3.093
	Compatibility	.385	2.597

a. Dependent Variable: Adoption of online payment

(Source: Researcher's survey, 2021)

According to Myers (1990) VIF value greater than 10 is a indicate multicollinearity; whereas tolerance value of below 0.1 will indicate a problem of multicollinearity as suggested by (Menard, 2002). Thus, as shown above in Table 4-5, VIF for all predictor variables is lower than 10, and tolerance levels are above 0.1 indicating that there is no problem of multicollinearity. Therefore, the assumptions for performing binary logistic regression were met and the logistic regression model will be considered adequate to test hypotheses of this study.

4.5.2. Binary Logistic Regression Result

Binary logistic regression analysis was done to examine whether the five perceived attributes of innovation, including relative advantage, compatibility, complexity, observability, and trialability; and the five demographic characteristics including, customer type, educational level, employment status, monthly income level, and age of the respondent are used to predict the adoption of online bill payment.

To examine the goodness-of-fit of the logistic regression model, the study used the omnibus test of model coefficients that gives an overall indication of how well the model performs, over and above the results obtained when none of the predictors are entered into the model. For this set of results, we need a highly significant value. The omnibus test of the model coefficient for this specific study is given in the table below.

The result of Omnibus Tests of Model Coefficients given below in Table 4-6 revealed that the result of the full model containing all ten predictor variables against the result of the model containing the constant only was statistically significant at χ^2 (df = 10, N = 238) = 206.824, $p < 0.0001$. This is an indication that adding of predictors to the model has significantly increased our ability to predict the adoption of online bill payment system.

Table 4-6: Goodness of Fit Statistic–Omnibus Tests of Model Coefficients

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	206.824	10	.000
	Block	206.824	10	.000
	Model	206.824	10	.000

(Source: Researcher's survey, 2021)

Table 4-7 headed model summary present the likelihood ratio test, another commonly used technique for measuring goodness-of-fit, which is simply the chi-square difference between the null model (i.e. the model that only includes the constant) and the model that contain predictors. The -2 log-likelihood ratio statistics is 61.941.

As displayed within Table 4-7, the value of Nagelkerke R^2 is .859 that shows the model explains roughly 85.9% of the variation in the outcome. Whereas the Cox & Snell R-Square of .581 and Nagelkerke R-Square of .858 signify the Adjusted R-Squares within a logistic regression model indicated that 58.1% to 85.8% of the variability of the dependent variable (i.e., adaption of online bill payment) is explained by explanatory variables included in the study.

Table 4-7: Goodness of Fit Statistics–Model Summary

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	61.941[a]	.581	.858

a. Estimation terminated at iteration number 10 because parameter estimates changed by less than .001.

(Source: Researcher's survey, 2021)

The result shown below in the Table 4-8 headed Hosmer and Lemeshow test that supposed to exceed the minimum threshold level of P-value =.05 is also suggest that the model is a good fit to the data as p = .997 (> .05).

Table 4-8: Goodness of Fit Statistics–Hosmer and Lemeshow Test

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	1.131	8	.997

(Source: Researcher's survey, 2021)

The other measure of goodness-of-fit in the logistic regression model was checked by observing the value in the prediction table to verify how well the model is able to predict the correct category (adopter/non-adopter) for each case. According to Pallant (2005), the fit is said to be good if the overall correct prediction rate exceeds 50%. As it can be seen below in Table 4-9, at the cut value of 0.5 our full model correctly classified 95.5% of non-adopters and 91.7% of adopters for an overall success rate of 94.5% of all cases, which is better than the 74.8% initial classification achieved by constant-only (null) model shown in (Appendix 2).

Table 4-9: Goodness of Fit Statistics–Classification Table

Classification Table[a]

Observed			Predicted		
			Adoption of online payment		Percentage Correct
			NO	YES	
Step 1	Adoption of online payment	NO	170	8	95.5
		YES	5	55	91.7
	Overall Percentage				94.5

a. The cut value is .500

(Source: Researcher's survey, 2021)

To examine the effect and statistical significance of independent variables in explaining the adoption of online bill payment system Wald statistic was used with null hypotheses (H0) that probability of adopting online bill payment system is independent of the corresponding perceived attributes of innovation and respondent's demographics.

Based on the result of binary logistic regression as shown below in Table 4-10 among the demographic variables only employment status and age of the respondent were found to be significantly influencing the adoption of online bill payment system at ($P < .05$). However, customer type, education level and monthly income have no statistically significant relationship with adoption of online bill payment system. Whereas three of the five perceived attributes of innovation variables were significant at ($P < .05$), including simplicity ($P = .001$), relative advantage ($P < .007$) and compatibility ($p = .038$).

Table 4-10: Result of Binary Logistic Regression Analysis

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1 [a]	TYPEC	-1.230	.930	1.751	1	.186	.292	.047	1.808
	EMPLOY	1.751	.845	4.288	1	.038	5.759	1.098	30.201
	EDUC	.268	.361	.551	1	.458	1.307	.645	2.651
	INCOME	-.407	.547	.553	1	.457	.666	.228	1.946
	AGE	-.177	.060	8.696	1	.003	.838	.745	.942
	TRLTY	.907	.508	3.192	1	.074	2.476	.916	6.695
	OBVTY	.277	.533	.270	1	.603	1.319	.464	3.750
	SPLTY	2.134	.639	11.157	1	.001	8.448	2.415	29.547
	UDVTG	1.502	.559	7.217	1	.007	4.493	1.501	13.444
	CMPTY	1.395	.671	4.324	1	.038	4.033	1.083	15.015
	Constant	-15.847	6.543	5.866	1	.015	.000		

a. Variable(s) entered on step 1: TYPEC, EMPLOY, EDUC, INCOME, AGE, TRLTY, OBVTY, SPLTY, UDVTG, CMPTY.

(Source: Researcher's survey, 2021)

4.6. Discussion of the Findings

Based on the finding of this study the researcher introduced the following discussion:

As shown in the above Table 4-10 headed results of binary logistic regression employment status has a positive and significant impact on the adoption of online electric bill payment at (P = .038) with an (Exp (B) = 5.759). This implies that that employed customers are five (5.759) times more likely than unemployed customers to adopt online electric bill payment. This may attribute to the fact that online bill payment would offer the advantage of convenience of paying bills outside of working hours and avoiding opportunity cost of time associated with cash based bill payment for employed customers as they spent their time on the job and pressured for time. Again, it also supports the qualitative finding that convenience and time saving are the primary advantages of online bill payment perceived by those respondents paying their monthly electric bill through online method. The result was consistent with those of Haile (2015) and Ong'wen (2012) who established a positive relationship between occupation and adoption of mobile banking in Ethiopia and adoption of Internet banking in Kenya respectively. Therefore, the null hypothesis that employments status has no significant effect on adoption of online electric bill payment is rejected.

The other independent variable that significantly affects the adoption of online electric bill payment is age of the respondent at (P = .003) with an (Exp (B) = .838) and a negative B value (B = –.177). This indicates that the increasing of age of the respondent operated in the opposite direction having a negative effect on adoption (B = -.177) and slightly decreased the chances for adoption by a factor of (Exp (B) = .838). Thus, a one-unit increase in the age of customers decreases the odds of adopting of online electric bill payment by a factor of .838. This may be due to the acquaintance of youngsters to computer and internet-based activities, as they tend to use social Medias like Facebook. The finding was consistent with result of a study made by Haile (2015), age is found as a significant factor for the adoption of mobile banking, and the result of a study made by (Abayomi et al., 2019; Mutengezanwa & Mauchi, 2013; Serener, 2016) showed that age has negative effect on the adoption of mobile banking. Therefore, the null hypothesis that age has no significant effect on adoption of online electric bill payment was rejected.

The result of the study also showed that simplicity has a significant and positive influence on the adoption of online electric bill payments at (P = .001) with an (Exp (B) = 8.448) and a positive B value (B = 2.134). This implies that customers who viewed online electric bill payment as being less complex to use and it takes less effort to make electric bill payment as compared to the traditional system had 8.448 times higher odds of adopting online electric bill payment and each unit increase in perception of this attribute increased the likelihood of adoption by 2.134. The finding is in agreement with the finding of the study made by Chandrasekar & Taye (2017) and Abebe & Lessa (2020) in Ethiopia, Kaur et al. (2020) in India and Ibidunmoye (2018) who established a positive relationship between perceived easiness to set up and use, and the adoption of mobile payment system in Sweden. Thus, the null hypothesis that simplicity has no significant effect on adoption of online electric bill payment was rejected and the alternative hypothesis simplicity has a positive and significant effect on adoption of online electric bill payment was accepted.

In addition, the variable relative advantage has also a positive and significant influence on the adoption of online electric bill payment at (P = .007) with an (Exp (B) = 4.493) and a positive B value (B = 1.502). This implies that customers who perceived online electric bill payment as having a relative advantage of cost saving, decreasing transaction processing time and security had 4.493 times higher odds of adopting online electric bill payment, and each unit increase in perception of this attribute increased the likelihood of adoption by 1.502. The finding is consistent with those of (Abebe & Lessa, 2020;

Chandrasekar & Taye, 2017; Kaur et al., 2020; Melka, 2017) who identified relative advantage as a positive and significant predictor of the adoption of online payment system, Automated Teller Machine (ATM) and mobile payment in Ethiopia, respectively. Therefore, the null hypothesis that relative advantage has no significant effect on adoption of online electric bill payment was rejected and the alternative hypothesis relative advantage has a positive and significant effect on adoption of online electric bill payment was accepted.

Moreover, the variable compatibility has a positive and significant influence on the adoption of online electric bill payment at (P = .038) with an (Exp (B) = 4.033) and a positive B value (B = 1.395. This implies that customers who perceived online electric bill payment as consistent with their life style, job aspect as well behaviour and attitude had 4.033 times higher odds of adopting online electric bill payment, and each unit increase in perception of this attribute increased the likelihood of adoption by 1.395. This result is consistent with the previous study of (Chandrasekar & Taye, 2017; He et al., 2006; Melka, 2017; Widayat et al., 2020). Thus, the null hypothesis that compatibility has no significant effect on adoption of online electric bill payment was rejected and the alternative hypothesis compatibility has a positive and significant effect on adoption of online electric bill payment was accepted.

In assessing the adoption of online electric bill payment, the study proposed ten hypothesizes and based on the findings of the study the acceptance or rejection of the propositions is summarised as follow.

Table 4-11: Summary of Hypothesis Tests

No	Hypothesis	Result	Sig. Level
1	The relative advantage of online electric bill payment positively and significantly affects its adoption.	Accepted	.007
2	The simplicity of online electric bill payment positively and significantly affects its adoption.	Accepted	.001
3	The compatibility of online electric bill payment positively and significantly affects its adoption.	Accepted	.038
4	The observability of online electric bill payment positively	Rejected	.603

No	Hypothesis	Result	Sig. Level
	and significantly affects its adoption.		
5	The trialability of online electric bill payment positively and significantly affects its adoption.	Rejected	.074
6	Age has a negative and significant effect on the adoption of online electric bill payment.	Accepted	.003
7	Higher income individuals are more likely to adopt online electric bill payment.	Rejected	.457
8	Educated individuals are more likely to adopt online electric bill payment.	Rejected	.458
9	Employed individuals are more likely to adopt online electric bill payment.	Accepted	.038
10	Domestic customers are more likely to adopt online electric bill payment.	Rejected	.186

(Source: Researcher's survey, 2021)

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

Having employed both quantitative and qualitative research approach, the general objective of this study was to investigate the obstructions of electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs. To achieve objectives of the study data were collected on the current practice of electric bill payment, the overall obstructions of electric bill payment and the factors that affect the adoption of online electric bill payment; and both descriptive and binary logistic regression analysis were used to analyse the data generated through questioner. This chapter presents a summary of the major findings of the study, the conclusion and necessary recommendations.

5.1. Summary of Key Findings

In assessing the obstructions of electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs, this study has developed three objectives as a guideline of the overall process. Therefore, summary of the findings of the study that derived from both descriptive and inferential analysis is presented in a logical order of specific objectives of the study.

5.1.1. Respondents Characteristics and Background Information

The findings of the study revealed that the gender distribution of respondents is heavily skewed on the male side where 68.9% were male and only 31.1% were female, in terms of age most (45.4%) of the respondents are between the age of 31 and 40, while respondents in their young ages (i.e., less than 30) recorded the lowest percentage (9.2%). On the aspect of the qualifications of the respondents in terms of their level of education majorities (66%) of the respondent had completed either primary or secondary school with the same level of education; in contrast to this only 34% of respondents had a university or college certificate (i.e., TVET, diploma, bachelor degree and masters of degree certificates). With regard to employment status of respondents, the study revealed that majority (75.6%) of the respondents was unemployed whereas only 24.4% of them were employed. Moreover, the estimated a monthly income of majority (72.2%) of the respondents fell in between 0-5,000 ETH birr.

The finding of this study also disclosed that most (71%) of respondents were household customers who use electricity for household purpose whereas only (29%) of the

respondents were organizational customers who use electricity either for commercial or industrial activities. In terms of the frequency of meter reading, most (79%) of the respondents states that the frequency with which meter readers has coming is irregular and the remaining 21% states that meter readers has coming monthly. With regard to the distribution of bill payment responsibilities among family members, the finding of the study revealed that most of the time male household heads have the responsibility to pay electric bill rather than female household head and their children as indicated by 50%, 38.7% and 21.8% of the respondents respectively. Furthermore, although customers use a multitude of electric consuming devises the respondents' use of electricity is primary for lighting, electronic appliances and cooking purpose as indicated by 100% (Electric bulb), 90.3% (TV, Radio, Fridge, etc.), 65.1% (Stove) and 18.5% (Electric Mitad) of the respondents. Whereas only 18.1%, 10.9% and 9.2% of the total respondents said that, they use electricity for Industry work, Office equipment (copy machines, boiler, lament, grander, miller etc.) and Washing machine respectively. Finally, the study revealed that the average monthly electric bill was about 328 ETH birr; the average distance from customer service center measured by walking distance was almost 26 minutes and the average time to pay bill measured by minutes was 78 minutes.

5.1.2. Electric Bill Payment Practice

The first objective of this study was to identify the current practice of electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs. The finding of the research shows that most of the respondents are paid their electric bills through cash at CSC and at CBE in person as indicated by two out of three (66%) and seven out of twenty (35%) of respondents respectively. While only 14%, 13%, and 2% of respondents paid through nearby agent CBE birr, using own CBE birr and Internet banking however, no one has paid through direct debit-standing instruction (DDSI). The indication is that most 178 (74.8%) of respondents paid their electric through traditional cash basis (conventional) payment methods which means three out of four respondents conduct bill payment at CSC and/or CBE by appearing in person. On the other hand, only 60 (25.2%) of the respondents are paid through online (electronic) bill payment method. In general, we can see from the results of the study revealed that the new online bill payment methods employed by the EEU are not being well used by the customers.

Not being a user of mobile or internet banking (79.3%), confidence on traditional method relative to online method (66.9%) and the need to get receipt (59.3%) were among the top rated reasons to keep using the traditional cash basis method of electric bill payment. In addition, the issue of the need to make trip any way to the CSC, having no or poor internet access and lack of awareness about the existence of online payment system as a payment option or how it work. As well as not having smart phone and fear of potential risk, including negative externality are reasons for continuing to pay through traditional methods as identified by 40.7% to 8.3% of respondents.

Although most of customers pay their electricity bill through the traditional method, the finding of the study revealed that among the benefits that customers realized on adopting the online electric bill payment method convenient, time and coat saving, pay their bill on time and being secured from the risk of COVID exposure are the prominent ones.

5.1.3. Obstructions of electric bill payment

The second objective was to assess the obstruction in electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs. Although, timely and accurate metering is the main prerequisite for efficient and effective electric billing the study revealed that the meter reading of most consumers are not taken regularly by the meter reader. Queuing (waiting) for a long time to make payment, not-timely entering of electric consumption for billing, exaggerated bill amount and inconvenience with all payment options are the most common problems in relation to the traditional cash basis method of electric bill payment as reported by 82.5%, 65.6%, 45% and 31.9% of respondents respectively. Whereas the online bill payment is not working properly, interruption of Internet connection and CBE birr agent not available nearly are the main challenges that customers experienced concerning online bill payments. Besides, the problem of not timely entering of electric consumption, balance brought forward (negative bill amount) and delayed reconciliation were also revealed as hindrance to the usage of online method of electric bill payment.

In addition, the result of this study shows that not easily availability of the prepaid card, unwillingness of EEU to make the change to a prepaid card and high cost of installing prepaid card are the main constraints that prevented customers of from being a prepaid card user. Moreover, frustration, lack confidence and fear of blackout of power due to sudden lasting of the amount of electric power purchased at any time when the vending station is inaccessible to recharge the card especially during holidays, evenings and

weekends are identified as the reason for non-adoption of a prepaid meter. Finally, inability to pay electric bill due to lack of enough income, encouraging the use of online bill payment to avoid the risk of exposure to COVID 19 and the difficulty to file complaint and gate quick responses due to lockdown are identified as the effect of COVID 19 in electric bill payment.

5.1.4. Adoption of Online Electric Bill Payment

The final objective was to identify factors that affect adoption of online electric bill payment. In order to achieve this objective data were collected on five innovation attributes, including relative advantage, compatibility, complexity, observability, and trialability; and five demographic characteristics including, customer type, educational level, employment status, monthly income level, and age of the respondent. Quantitative analysis of binary logistic regression was employed to identify and validate predictors of online electric bill payment adoption.

According to the study results, the logistic regression model validated the impact of three innovation attribute variables including simplicity (P = .001), relative advantage (P < .007) and compatibility (p = .038) as they positively and significantly influencing the adoption of online electric bill payment; and two demographic variables including age of the respondent (P = .003) and employment status (P = .038).

Whereas the remaining independent variables observability, trialability, customer type, education level and monthly income have no statistically significant influence on the adoption of online electric bill payment, but the direction of their influence was as expected based on the theoretical framework and prior empirical research except for the variable educational level.

5.2. Conclusion

To conclude the research study to investigate the obstructions of electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs it is important to remind that research design adopted for the study was mixed approach. To achieve objectives of the study data were collected on the current practice of electric bill payment, the overall obstructions of electric bill payment and the factors that affect the adoption of online electric bill payment; and both descriptive and binary logistic regression analysis were used to analyse the data

generated through questioner. Finally, major conclusions concerning the result of the study are as follows:-

The majority of customers paid their electric bills through traditional cash basis (conventional) bill payment methods. Not being a user of mobile or internet banking, confidence on traditional method relative to online method and the need to get receipt (physical proof of payment) were the main reasons to keep using the traditional cash basis method of electric bill payment.

Not timely (irregular) meter reading and unwillingness to correct meter reading errors were the main problems related to meter reading. Whereas queuing (waiting) for a long time to make payment, not-timely entering of electric consumption for billing, exaggerated bill amount were the most common problems in relation to the traditional cash basis method of electric bill payment.

In spite of a very low online electric bill payment adoption rate the ability to pay electric bills independence of time and place (i.e., from anywhere at any time), reducing the time required to travel and queuing, and saving monitory expenses associated with transportation cost and penalty imposed on delayed payment were the primary advantages of online electric bill payment. While lack of synchronization, interruption of internet connection and non-availability of CBE birr agents in close destination were the main challenges of online electric bill payment.

Inaccessibility or the difficulty to get a prepaid card was the main constraint that prevented customers of from being a prepaid card user, and the main impact of COVID 19 on electric bill payment was decreasing customers' income and their ability to pay monthly electric bills on time.

Finally, this study provides some evidence on the factors that affect adoption of online electric bill payment in EEU Jimma district, Agaro and Sokoru town CSCs. Notably simplicity, relative advantage, compatibility, age and employment status are found to be significant determinants adoption of online electric bill payment. While observability, trialability, customer type, level of education and monthly income are found to have no significant influence on the adoption of online electric bill payment.

5.3. Recommendations

Based on the above summery and conclusion the study forwards the following recommendations:-

- As the problems of not timely (irregular) meter reading and unwillingness to correct meter-reading errors in meter reading cycle may leads to delay (not timely delivery of bill) and issuance of inaccurate (usually inflated) bill amount in the billing process; and finally this interrelated technical and procedural problem is manifested through customer grievances. That means without fixing meter-reading problems it is unimaginable to resolve the persistent bill related customer complaints only through modernising and offering multiple bill payment options, thus a preliminary focus and effort should be directed towards modernising and improving metering activity. Therefore, to solve problems related to metering & billing it is advisable to:
  - ✓ Modernising and improving metering activity by implementing common meter reading instrument (CMRI) and expanding the introduction of prepaid meter,
  - ✓ Assure timely meter reading,
  - ✓ Coordinate metering and billing activities, and
  - ✓ Issue bills accurately & timely.
  - ✓ Work on expanding online electric bill payments in orders to solves the problem that customers experienced concerning cash basis method of electric bill payments.
- As the result shows, most of customers are not adopting online electric bill payment while the main reasons for non-adoption are attributed to not being a user of mobile or internet banking, confidence on traditional method relative to online method and the need to get receipt (physical proof of payment), this reveals that E-banking services are still new for Ethiopians. Thus, to improve adoption rate it is important to give greater emphasis on:
  - ✓ Advertising online electric bill payment option to increase customer awareness,
  - ✓ Changing the negative perception by customers with insecure feeling towards online electric bill payment,
  - ✓ Giving trainings for the customers who lack the required skills to allow customers effectively able to use online electric bill payment option, and

- ✓ Creating awareness to public about the E-banking products and the benefits associated with using E-banking services.

- ❖ Moreover, the major challenges of online electric bill payment that were mentioned by customers including lack of synchronization, interruption of internet connection and non-availability of CBE birr agents in close destination must be addressed in collaboration with all bodies (i.e., EEU, Ethio-telecom and CBE), so as to reduce hindrances that could deter customers from preferring the system.

- ❖ Finally, the finding of this research show that simplicity, relative advantage, compatibility, age and employment status has significant influences on the adoption of online bill payment. Thus, in order to enhance the adoption of online electric bill payment EEU, and its partner companies such as CBE as payment system operator and Ethio telecom as mobile network service provider should focus on the simplicity, relative advantage and compatibility aspects of online electric bill payment system and their initially targets should be young and employed customers.

5.4. Direction for Further Research

This study examined challenges in electric bill payment in the case of customers who have a post-paid meter. However, it is better if both prepared and post-paid meter challenges are included by the future researcher on the related issue. Additional as the result of this study from ten variables five of them significantly affect the adoption of online electric bill payment while from main variables trialability and observability and from the demographic variables income, education, and customer type were insignificant relationships with the adoption of online electric bill payment. This may be due to the method of data collection or other factors, so it is avenues for future researchers to oversee this issue.

Although DOI theory is preferred to undertake similar researches, there are also other models such as the TAM and TRA. This study adopted variable from Rogers's DOI theory to identify determinant factors of adoption of online electric bill payment. However, there are so many other variables not included in this study. Thus, future researchers may be interested in validating the consistency of the result and provide supplementary results for this study by including another variable from other theories independently or in combination with the DOI theory.

For those who want to use DOI theory in their study, there are some implications. First, although Rogers (1995) innovation adoption framework was developed to generally predict adoption of innovations according to potential adopters' perceptions of innovation and the predictive power of the innovation attributes may vary with the nature of the particular innovation that is being studied. Second, the nature of potential adopters and the circumstances in which they make decisions also should be considered. Researchers should also be aware of whether or not potential adopters have a choice over the adoption of innovation.

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APPENDIX I: QUESTIONNAIRE

JIMMA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS

Dear Respondents; this questionnaire is designed to identify the major challenges in electric bill payment system in Ethiopian Electric Utility, Jimma District. Your response will be kept confidential and used only for academic purpose. Kindly provide your response based on your experience in the last one year

Part A: Give your Background Information in the space provided			
Town	_____	Sex:	_____
Customer Type	_____	Age:	_____
Monthly Income	_____	Education level:	_____
Employment Status	_____	Service center distance	_____
Average Monthly bill	_____	Average Time to pay bill	_____
Type of Meter Reader	_____	Frequency of meter reading	_____

Part B: Give your opinion to the following questions based on your experience in the last one year by putting tick mark (√) on the appropriate choice(s). You can select more than one choice whenever necessary.

1. Who is responsible for paying electric bill at home?
   ( ) Husband ( ) Children
   ( ) Wife ( ) Others,_____
2. Which electric consuming devises do you use at home?
   ( ) Electric bulb ( ) Electronic devises (TV, Radio, Fridge etc)
   ( ) Stove ( ) Industry work
   ( ) Electric Mitad ( ) Office equipment
   ( ) Washing machine ( ) Others,_____
3. What challenges have you faced in connection to meter reading (postpaid meter reading)?
   ( ) Meter Reader not coming monthly
   ( ) the meter reader has technical problem
   ( ) Not willing to correct errors in meter reading
   ( ) Damaged meter not repaired on time
   ( ) Not getting a meter on time from EEU
   ( ) Others,_____
4. How do you pay your monthly electric bill?
   ( ) By Cash at Customer service center monthly ( ) Using my own CBE birr
   ( ) By Cash at Commercial Bank of Ethiopia monthly ( ) Using Internet Banking
   ( ) Direct deduction from my Bank account ( ) Using Mobile Banking

( ) Using CBE birr of nearby agent ( ) Others,_____

5. If you have paid by cash at service center or at Commercial Bank of Ethiopia, what are your reasons for selecting this method?

( ) Since it gives me confidence/ Security
( ) I do not have smart phone for mobile banking
( ) Since they give me receipt
( ) I do not have internet access
( ) no awareness about the e-payment system
( ) I have to make trip any way
( ) Since I do not use mobile or internet banking
( ) others, _____

6. What challenges have you experienced in relation to electric bill payment on cash basis (paper based Billing)

( ) KWH consumed not entered timely for billing
( ) The cash collectors are not ethical
( ) Exaggerated payment most of the times
( ) Cutting of electric line for delay in payment
( ) Long waiting time for payment at the center
( ) Not giving grace period for large payment
( ) All payment systems not convenient to me
( ) Others,_____

7. If you are using CBE birr, Mobile banking or Internet banking, what benefit have you obtained?

( ) Time saving ( ) More convenient
( ) Cost saving ( ) More Secured
( ) Pay bill on time ( ) Others,_____

8. What challenges have you experienced in relation to online bill payment method?

( ) Interruption of Internet connection
( ) The online payment system not working properly
( ) CBR agent not available in close destination
( ) Others,_____

9. What is the effect of COVID 19 in electric bill payment?

( ) It encouraged me to use online bill payment
( ) I was exposed to COVID while paying bill
( ) It reduced my income and unable to pay bill
( ) Others,_____

10. What challenges prevented you from being a pre-paid card user?

( ) The prepaid card not available easily
( ) It is too costly to install prepaid card reader
( ) EEU is not willing to make the change to prepaid
( ) Others,_____

Part C: Here are a list of reasons that you might have for gaining access to and using an online electric bill payment. For each reason that is mentioned, please indicate your level of agreement or disagreement as to whether this reasons would influence yourself to use online electric bill payment.

1= strongly disagree, 2= Disagree, 3 = Neutral, 4 = Agree, 5 = strongly agree

No	Items	Likert Scale				
S1	Learning to operate online bill payment would be easy to me	1	2	3	4	5
S2	The steps in online bill payment are very simple to remember	1	2	3	4	5
S3	It takes less effort to make online bill payment compared to the traditional system	1	2	3	4	5
T1	I want to be able to properly try out online bill payment	1	2	3	4	5
T2	I want to use online bill payment on a trial basis long enough to see what it can do.	1	2	3	4	5
T3	I like being able to try out before deciding whether I like it or not.	1	2	3	4	5
U1	Online bill payment would enable me to accomplish my tasks more quickly	1	2	3	4	5
U2	Online bill payment is more secured than traditional cash payment	1	2	3	4	5
U3	Online bill payment would save my expenses associated to different things	1	2	3	4	5
C1	Online bill payment would be compatible with most aspects of my work.	1	2	3	4	5
C2	Online bill payment would fit my behavior and attitude	1	2	3	4	5
C3	Online bill payment would fit well with my living style.	1	2	3	4	5
O1	Other people seemed interested in online bill payment when they saw me using it.	1	2	3	4	5
O2	People can tell me that I know more about my electric consumption since I have used online payment	1	2	3	4	5
O3	Many people appreciated my use of online bill payment	1	2	3	4	5

Part D: Open ended Questions

1. Kindly provide any additional challenges related to electric bill payment system at Ethiopian electric utility

_____
_____
_____
_____
_____
_____
_____
_____
_____

2. Kindly provide your own recommendations to the challenges related to electric bill payment system

_____
_____
_____
_____
_____

APPENDIX II: CLASSIFICATION TABLE OF CONSTANT-ONLY (NULL) MODEL

Classification Table[a,b]

Observed			Predicted		
			Adoption of online payment		Percentage Correct
			NO	YES	
Step 0	Adoption of online payment	NO	178	0	100.0
		YES	60	0	.0
	Overall Percentage				74.8

a. Constant is included in the model.

b. The cut value is .500