An Evaluation of Cashless Payment Technologies Adoption and Acceptance in the Banking Sector: A Case Study of the Commercial Bank of Ethiopia

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Abstract

Recently, there has been a striking rise in the usage of non-cash payment methods, and research has followed a similar trajectory, particularly when examining the variables impacting the uptake and efficacy of e-commerce in the banking sector. Yet, compared to the traditional over-the-counter service, nothing has been done to establish these aspects and the growth of cashless banking in Ethiopia. This study set out to assess how widely used and favored cashless banking technology is among Ethiopia's commercial banks. The study is based on information acquired through a questionnaire from four Commercial Bank of Ethiopia areas. A purposeful sampling method is employed to draw the sample from the population. Both quantitative and qualitative research approaches are employed. The findings of this study revealed that age, income, usefulness, perceived risk, perceived cost, and ease of use had a great influence on cashless banking adoption. The study recommended that the Commercial Bank of Ethiopia increase security for E-banking products and create deep community awareness about banking technology, while the government should support the banking sector by facilitating sufficient infrastructure and development and issuing clear and workable legal frameworks to ease the adoption and growth of cashless banking services in Ethiopia.

Keywords: Cashless banking, mode of payment, and technology acceptance model

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Introduction

In today's financial system banks are becoming the heart of the economy of any country (Goyal and Josh, 2011). They are playing intermediary role between the surplus and deficit saving units within an economy. Banks facilitate the emergency of efficient allocation and distribution of national savings. To achieve this, banks use different payment modalities such as currency notes, checks, automated teller machine, web-based transactions, mobile money, mobile banking and others. The use of cash has many limitations. To this end, the world is shifting from old cash handling system to cashless society, which is different prevalence rate worldwide.

A cashless policy does not mean a total absence of cash transactions in the economic setting but one in which the circulation of physical currency is minimal. It is an economic system in which money is not the dominant medium of exchange. The essence of the policy is to shift the economy from a cash-based economy to a cashless one. The policy also aims to improve the effectiveness of monetary policy by managing inflation in the economy and maintaining a stable pricing system (Garg, 2017). Garg (2017) stated that an efficient and modern payment system is the key enabler for growth and development.

In a cashless economy, the use of a number of electronic channels for delivering banking services to consumers is becoming common, such as automated teller machines (ATMs), e-wallets, points of sale (POSs), the internet, and mobile devices. Customers of banks can perform banking transactions with time flexibility through electronic banking channels. In addition, the adoption of a cashless policy has enabled banks to make international transactions more truthful (Alkhaldi, 2016).

According to Woodford (2003), a cashless economy is defined as "one in which there are assumed to be no transaction frictions that can be reduced through the use of money balances and that accordingly provide a reason for holding such balances even when they earn a rate of return." For the European Central Bank, electronic money is broadly defined as an electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transactions but acting as a prepaid bearer instrument.

A large part of the population around the world is still outside the scope of net banking. With the use of credit or debit cards, making transactions using mobile phones, and using the internet to pay bills, they are not in a position to reduce their dependence on cash. The global volume of non-cash transactions totaled 260 billion in 2009 (World Payments Report, 2011), after sustaining average annual gains of 6.8% since 2001. The outright volume of these payments remains heavily concentrated in developed markets. Developing countries are just improving their payment infrastructures, enabling wider adoption and greater usage of non-cash means and channels. However, cash is still a dominant means of payment in developing countries. Cash as a mode of payment is an expensive proposition for any government (Yaqub et al., 2013). As a result, many governments are seeking to reduce these costs and encourage the use of non-cash payment methods. The Ethiopian economy is too heavily cash-oriented in its transaction of goods and services, and this is not in line with the global trend, considering Ethiopia's ambition to be among the middle-income countries of the world by the year 2020. The challenges faced by high cash usage, among others, include robberies and cash-related crime; revenue leakage arising from too much cash handling; inefficient treasury management due to the nature of cash processing; high subsidies; a high informal sector; etc. Heavy cash dependency is also subject to illegal activities like black money, counterfeit notes, and other related frauds.

Most previous research on cashless banking or technology adoption has focused on economic factors that influence financial institutions' and users' decisions to adopt the service rather than behavioral and social aspects (Chakava, 2015; Shah et al., 2005; Kerem, 2003). The effects of socioeconomic factors on cashless banking adoption have primarily been studied qualitatively; therefore, additional quantitative empirical studies are required. This research stream's theoretical approach, which studies performance and potential influence factors, is primarily concerned with behavioral and attitudinal perspectives.

These studies have considered the factors that influence cashless banking adoption from the user's point of view and have not really been interested in the processes, even though they might be affected by the characteristics of the management team and have a potential influence on organizational performance. Besides, the above studies did not assume the demographic characteristics of respondents, which might have a direct and strong influence on technology adoption (Taylor and Todd, 1995). Moreover, even though users' perceptions of the new

technology had an influence on technology acceptance (Davis, 1989), prior studies mainly focused on cost and security issues (Chakava, 2015; Kerem, 2003). Therefore, the theoretical approach must be extended.

Several pieces of research (Masinge, 2010; Ajayi and Ojo, 2006; Yaqub et al., 2013), among others, have been conducted on the areas of the cashless economy. However, to the best of our knowledge, there is no research on the same topic in Ethiopia. A study by Yaqub (2013) tries to identify the prospects of a cashless economy, but it is wholly descriptive and content-based. Ajayi (2006) indicated that security concerns are one of the major problems hindering the adoption of a cashless policy in Nigeria. Masinge (2010) discovered that perceived trust is a significant factor in the acceptance of non-cash payment instruments.

This study is different from previous studies on the following grounds: First, it will be conducted in Ethiopia, which has different social, political, and economic settings. Second, it uses econometric analysis to identify significant factors of acceptance and adoption of the cashless policy in the Ethiopian context. Third, the study will also include the unbanked consumers and potential customers of commercial banks in Ethiopia. Therefore, the main objective of the study is to assess and evaluate the adoption and acceptability of a cashless policy in the Ethiopian banking industry.

Literature Reviews

A cashless policy is one in which it is assumed that there are no transaction frictions that can be reduced by using money balances and that thus provide a reason for holding such balances even when they earn a rate of return (Woodford, 2003). According to Costa Storti, and De Grauwe (2001), a cashless policy is a system in which currency issued by the central bank has ceased to exist or has been reduced. It represents the pure state of non-cash payment systems, where no more sturdy coins and notes are printed for circulation by the Central Bank. All the money is private money issued by banks in the form of deposits or some fancier e-money issued by institutions that are not necessarily banks.

Contrary to the above definitions, a cashless economy does not refer to an outright absence of cash transactions in the economic setting but rather one in which the amount of cash-based transactions is kept to the barest minimum. It is an economic system in which transactions are not predominantly done in exchange for actual cash. It is not also an economic system where goods and services are exchanged for goods and services (the barter system). It is an economic setting in which goods and services are bought and paid for through electronic media (Ajayi, L.B., 2014).

As it is argued by scholars, there is no right definition of the cashless economy. The Basel Committee (1998) admitted that it was difficult to rightly define the cashless policy but agreed that it has both technological and economic characteristics. Other renowned institutions and experts have tried to define the concept of electronic money, which they all believe is the backbone of the cashless economy. For the European Central Bank, electronic money is broadly defined as a monetary-electronic store of money value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transactions but acting as a prepaid bearer instrument.

The major tools of cashless policy consistently used are mainly five, though the use of a check is becoming outdated (Muhibudeen and Haladu, 2018). These platforms for non-cash payments are as follows: automated teller machines (ATM), mobile banking, internet banking, point of sale (POS) terminals, and checks.

The demise of cash and the emergence of a cashless society pose a lot of benefits for society. In modern macroeconomic management, the role of the payment system is to channel financial resources from one segment or sector of the economy to another. For about two centuries, cash was the primary payment instrument in day-to-day commerce, helping ordinary people trade their labor and products for the goods and services they needed (Ajayi, L.B., 2014). Yet slowly but surely, alternatives to cash have taken root and grown. The emergence of alternative payment systems and increased use of electronic transfer systems have led to the prevalence of a cashless society (Humphrey etal., 1996).

Moses-Ashike (2011) suggested that a cashless economy helps stem the spread of black money. As a result, it reduces real estate prices because most black money is invested in real estate, which

inflates the prices of real estate markets. Cash notes may also be fake, which has a huge negative impact on the economy. By adopting a non-cash payment instrument, the risk can be minimized. An increase in digital payments instead of cash would enable a more detailed record of all the transactions that take place in society, allowing more transparency in business operations and money transfers that reduce tax avoidance and money laundering. Cashless economies also reduce the cost of banking services. It also improves monetary policy in managing inflation and increases economic growth. Another benefit of a cashless economy is that it discourages cash-related fraud and other cash-related crimes.

Ezuwore et al. (2014) indicated a variety of benefits expected from a cashless economy from three perspectives: in the first place, consumers exercise convenience, enjoy more service alternatives, minimize risk related to cash, have easy access to banking services outside of bank branches, and have access to credit. Second, for organizations, access to capital reduces cash handling costs and reduces revenue leakage. At the same time, the non-cash payment system mitigates the government's workload by increasing tax collection, promoting greater financial inclusion, and increasing economic development.

Garcia-Swartz et al. (2006) identified numerous interrelated benefits of a cashless policy. The policy can trace double spending, and double spending protects content by exposing the double spender's identity. Digital cash is a foolproof way of guarding against the illegal redistribution of intellectual property and materials. It can also help to disclose shadow economies, expose hidden transactions in the banking system, and increase transparency, confidence, and participation in the financial system. Automated electronic payments, which are an integral part of the cashless policy, act as a gateway into the banking sector and as a powerful engine for growth. Such payments draw cash out of circulation and into bank accounts, providing low-cost funds that can be used to support bank lending for investment—a driver of overall economic activity. The process creates greater transparency and accountability, leading to greater efficiency and better economic performance. Thus, it creates financial inclusion by making it easier and more affordable for the unbanked and under-banked to access financial services (Yaqub etal. 2013).

Cashless policies, despite their numerous benefits, come with their own challenges, even in the developed world (Swartz et al., 2004). Ajayi, L. B. (2014) looks at some of these challenges with

a specific focus on behavioral, attitudinal, perceptional, and infrastructural constraints. Behaviorally, people by their very nature are conservative and resistant to change, which explains why people may hesitate to adopt new innovations. And low levels of infrastructure penetration and poorly developed telecommunications impede smooth development and improvements in e-payments and e-commerce.

Harrison (2012) hypothesized many of the factors affecting the adoption of cashless policy practices and E-banking, which are in part dependent on other technologies and management practices that form a technology cluster. Organization for Economic Co-operation (2004) also listed out the common challenges, including a lack of ICT skills, a high rate of illiteracy, a lack of reliable power supplies, a lack of qualified personnel, a fear of risk, and a tendency to be content with the existing structure.

Material and Methods

The research design is the conceptual framework within which research is conducted; it constitutes the blueprint for the collection, measurement, and analysis of data (Kothari, 2006). In order to study the determinants of cashless policy adoption and acceptance from different perspectives, a hybrid of quantitative and qualitative research approaches was used. The rationale for using such a mixed approach in this study is to gather data that could not be obtained by adopting a single method. Moreover, some of the qualitative data in this study cannot be described and manipulated numerically. That is why the researcher applied a mixed research approach.

The study was conducted by collecting data from both primary and secondary sources. Primary data were collected from customers of the Commercial Bank of Ethiopia based on a structurally designed questionnaire. The questionnaire included both closed-ended and open-ended questions, which gives the respondents an opportunity to adequately express their views on the questions. The structured survey questionnaires were in English, and those were distributed to 325 randomly selected respondents.

The population of the study consists of all customers of the commercial bank of Ethiopia, which is operating all over the country. Based on the annual report of the commercial bank of Ethiopia (2017), there were 15 districts and 1251 branches as of December 31, 2017. In order to undertake

this study, the researcher purposely selected four districts and their district offices located in Addis Ababa city, which have adopted E-banking technology. The use of purposive sampling helped the researcher use judgment for selection in order for the objectives to be met and the research aim to be fulfilled with sufficient depth (Rojon & Saunders, 2012). According to Zikmund (2003), with judgmental (purposive) sampling, an experienced individual selects the sample based on some appropriate characteristics of the sample member.

For a population of 500,000 or more, a sample size of 306 is required to obtain a 95% confidence level and a range of error of 5% (Zikmund, 2003). From the 325 questionnaires prepared and circulated, a total of 315 were received. Of these, three filled-out questionnaires had to be discarded due to invalid or incomplete data entries. Thus, the sample, comprising a total of 312 respondents, was used for analysis. This exceeded the minimum required sample size of 306 to achieve a 95% confidence level for a population greater than 500,000 (Zikmund, 2003). In order to answer the research questions, both descriptive and econometric analyses were employed to analyze the collected data based on the nature of the objectives.

So as to show the determinants of adoption and acceptance of the cashless practice in commercial banks of Ethiopia, the binary logit regression model is used. The model used is important to identify the factors influencing the adoption of a cashless payment system. Since adoption is a dummy variable, the study used a logit model.

Table 1

Description of Variables

Variable Name	Variable type	Expected Sign	Reference
Dependent Variable			
Adoption	Binary (1 = adopt 0 = do not adopt)		
Independent Variables			
Perceived usefulness	Likert Scale	Positive	Venkatesh et al. (2003)
Perceived ease of use	Likert Scale	Positive	Venkatesh et al. (2003)
Performance risk	Likert Scale	Negative	Brown et al. (2003); Lee (2009)
Financial risk	Likert Scale	Negative	Brown et al. (2003); Lee (2009)
Time risk	Likert Scale	Negative	Brown et al. (2003); Lee (2009)
Security risk	Likert Scale	Negative	Brown et al. (2003); Lee (2009)
Perceived cost	Likert Scale	Unknown	Wu & Wang (2005)
Integrity	Likert Scale	Positive	Bhattacharjee (2002); Gu et al. (2009)
Benevolence	Likert Scale	Negative	Bhattacherjee (2002); Gu et al. (2000)
Ability	Likert Scale	Positive	Bhattacherjee (2002); Gu et al. (2009)
Age	continues	Unknown	Venkatesh et al. (2003)
Income	continues	Positive	Faniran,& Odumeru (2015)
Gender	Dummy	Unknown	Venkatesh et al. (2003)
Education	continues	Positive	Venkatesh et al. (2003)

Source: Own Compilation based on Literature

Data Analysis and Discussion

In this section, we first present the results of the descriptive statistical analysis. These include the perception and awareness of the cashless payment model and the challenges in adopting this system. The results of summary statistics for the demographic factors (age, gender), socio-economic factors (income, education), and their relationship (unconditional correlation) with adoption decisions are also provided (see Appendices A and B). We then present the results of the estimation of the probit regression.

Perception and Awareness of Cashless Mode of Payment

To uncover the respondent's perception of cashless payment services, different questions were forwarded to them. The first question was asked whether they knew about cashless banking services or not. The findings reveal that 238 of the respondents indicated that they knew about cashless banking, while 74 indicated that they had never heard of it before. This clearly shows that most of the respondents knew about the cashless banking services offered by their banks.

Table 2

Individuals' Awareness of Cashless Banking

Do you know about cashless banking?	Freq.	percent	cum.
No	74	23.7	23.7
yes	238	76.3	100
Total	312	100	

Source: own computation

Table 2 below provides information on adoption given the awareness level of the respondents. The results imply that awareness is one factor that affects the adoption of cashless banking tools. 208 individuals out of the 238 respondents who are aware of the system are users of it. Nevertheless, this does not mean all who have awareness are adopters. On the other hand, those who have no awareness at all do not use it as expected.

Table 3

Cross Tabulation of Adoption by Awareness

Do you use Cashless Banking	Do you know about Cashless banking?		
	No	Yes	Total
Do not adopting	73	30	103
Adopting	1	208	209
Total	74	238	312

Source: own computation

Individuals' Perception on Convenience of Cashless Payment Service

To determine whether the respondents reckoned that cashless banking was more convenient than its alternatives, they were asked to decide whether they currently believed cashless banking was convenient or not. The study shows that the majority of the respondents, approximately 87%, indicated that cashless payment is convenient, while only 17% believed that cashless banking is not more convenient than a cash-based payment. The respondents were also asked to justify how cashless banking is more convenient than the conventional payment system. The respondents replied that using contactless payment methods is much easier to handle, more efficient, and faster.

The respondents also stated on the convenience associated with cashless payment method are in general that comes with the process. This involves the ease of use of the method and the speed of using, as it is seen as a time saver to use cashless methods. With the convenience aspect of cashless methods, the respondents stated that "to make purchases in electronic form, it surfaces no need to obtain cash in hand, no need to go to a cash point to take cash out everything goes on to electronic devices or payment cards". The broad overview of opinions found on cashless payment method demonstrating that from valid responses 72% of respondents deemed cashless payment to be easy to use and a quick way of payment.

Table 4:

Respondents' Perception on Convenience Aspect of Cashless Payment Service

Do you think that using cashless banking? is more convenient than using cash-based service?	Freq.	Percent	Cum.
No	41	17.23	17.23
Yes	197	82.77	100.00
Total	238	100.0	

Source: own computation

Respondents' Perception on Effectiveness of the Cashless Banking Service

Questions were asked to establish the feelings of the respondents on the efficaciousness of the cashless banking services of the banks. It is important to note that for the question forwarded, respondents had the highest percentage for the 'yes' response. This means that the majority felt that banks' cashless banking services are efficient. Efficient service lowers costs and saves time. 41% of the respondents believe that the CBE cashless banking service is not efficient. Respondents also requested to explain their responses. Based on that, they indicated that system failure, invalid transactions, and delays in processing transactions make the service inefficient. It is also important to note that 59% of respondents believed that cashless banking transactions were effective.

Table 5

Respondents' Perception on Effectiveness of Cashless Payment Service

Do you think that using Cashless banking is? more Efficacious than cash-based payment service?	Freq.	Percent	Cum.
No	98	41	41
Yes	141	59	100
Total	239	100	

Source: own computation

Trust Worthiness of Cashless Banking Service among CBE Customers

The literature highlights that higher levels of trust in cashless banking service providers will lead to a greater intention on the part of the user to engage in cashless banking transactions (Cho *et al.,* 2007). From the sampled respondents, 68% agreed that cashless banking services are more trustworthy than cash-based banking, while 31% believed that cashless banking is not trustworthy.

Table 6

Respondents' Perception of Trust on Cashless Banking Services

Trust on cashless banking	Freq.	Percent	Cum.
Not trustworthy	75	31.38	31.38
Trustworthy	164	68.62	100
Total	239	100.00	

Source: own computation

The respondents were also requested to justify their reasons if they replied "No". The biggest worry that most respondents had was that when transaction errors occur, they worry that they may not get compensation from the bank. 65 percent of those who wrote their reasons shared this sentiment. The worry can be fully justified, bearing in mind that whenever an error occurs during conventional in-hall banking, a customer can always seek further clarification from a bank official. In cashless banking, any ambiguity in the user prompting instructions could end up giving different messages to different customers, and this can easily lead to costly mistakes on their side.

Furthermore, respondents feared that when transferring money through cashless banking channels, they would easily lose money due to careless mistakes. Respondents also confirmed that when money is sent through cashless banking channels, sometimes it is sent to the wrong destination and double payment occurs. This fear may be an obstacle in the cashless banking adoption process. The mean test for cashless banking adoption for the two groups—those who believe that it is more trustworthy than cash and those who believe it is not trustworthy—shows that there is a significant mean difference. This implies that those who believe it is trustworthy are using the cashless banking service more than those who believe it is not trustworthy. This can be evidenced by the two-sample test: with a 95% significance level, there is a significant mean difference between those who said cashless banking is trustworthy and those who said it is not trustworthy.

Challenges Facing Cashless Banking Adoption

Understanding the challenges encountered by customers in cashless banking provides useful insight into reasons why customers may not be using or signing up for cashless banking services as expected by the cashless banking service providers. These challenges may indicate shortcomings in the services being provided or challenges for the customers themselves. Therefore, service providers are better aware of how to improve their services, how they package these services, and how they present them to customers. Some customers' decisions to adopt a product or service are determined by their perception of the product. The respondents, both adopters and non-adopters, were therefore asked to rate how the identified challenges impacted their cashless banking adoption process.

The study identifies seven major factors that could be barriers to the adoption of cashless banking. Those factors are lack of computer literacy, limitation in network distribution, limited knowledge of customers about cashless banking services, absence of financial networks that link different banks, frequent power disruptions, fear of risk aspects, and the relatively high cost of the internet and the services.

A total of seven questions on the challenges of cashless banking were asked to indicate the extent to which each respondent believed the level of hindrance to corresponding closed-ended statements was rated on a five-point Likert-type scale ranging from "no hindrance" to "great hindrance." The summary of the results for all the variables under the research study and the result with respect to each statement are provided in the appendix (see appendix for detail).

In this section, we provide the results of the ranking of the challenges in the adoption of cashless banking services. The responses were analyzed and ranked to determine the challenges that hinder customers the most, as represented in the table below:

Table 7

Mean Rank of Obstacles for Cashless Banking Adoption

Challenges	Mean rank	Mean	Std. Deviation
limitation in network infrastructure	1	4.21	1.100
lack of computer literacy	2	3.87	1.238
fear of risk aspects	3	3.87	1.256
frequent power disruption	4	3.69	1.158
absence of financial networks that links different banks	5	3.36	1.366
lack of awareness with cashless mode of payment	6	3.09	1.253
Relatively high cost the cashless banking services	7	3.08	1.322

Source: own computation

According to the results above, the most significant barrier to cashless banking adoption is a lack of network infrastructure, followed by a lack of computer literacy, which includes handset operability of electronic devices. The cost of the cashless banking service was ranked as the least impediment to adoption. Fear of risk aspects in cashless banking was mentioned as an additional challenge or hindrance, mostly by those who were unaware of the service. This information is important because it can be used to improve existing services by addressing challenges, making cashless banking more appealing to customers, and making their experience with these services more pleasant.

Econometric Analysis

In this section, we provide the regression results of the logit model, used to determine the relationship between the dependent variable cashless banking adoption status and the independent potential explanatory variables, which include income, age, gender, education level, perceived usefulness, perceived ease of use, perceived cost, performance risk, time risk, security risk, financial risk, ability, integrity, and benevolence.

Table 8

Logistic Regression Estimates

Dependent Variable	Adoption(1/0)					
Adoption	Odds ratio	Std. Err	z	*p > z*	[95	conf. interval]
Age	.8563961	.341865	-3.88	0.000	.791919	.9260645
Gender	.4862958	.3186398	-1.10	.271	.1346357	1.75647
Income	1.000241	.0000835	2.88	.004	1.000077	1.000404
Education	1.226734	.2529224	0.99	.322	.8189427	1.837584
Perceived usefulness						
Not useful	.3452272	.4346628	-0.84	.398	.0292677	4.072127
Useful	33.47191	41.00351	2.87	.004	3.033528	369.3287
Ease of use						
Not easy	3.131447	4.673808	.76	.444	.168099	58.33443
Easy	10.03031	12.41687	1.86	.063	.8863036	113.5132
Perceived cost						
Costly	.0129683	.0307145	-1.83	.067	.000125	1.345536
Not costly	.2141138	.5040929	0.65	.513	.0021215	113.5132
Risk	.6080712	.1187071	-2.55	.011	.4147473	.8915081
Trust	.8646604	.1418139	-0.89	.375	.6269589	1.192483
Constant	14146.07	66746.3	2.03	.043	1.362562	1.47e+08

Source: Own Computations

The logistic regression results show that all independent variables together significantly affect the dependent variable, which is represented by prob.> chi2, which is less than 5%, and conclude that all independent variables together are determinant factors. The pseudo-R2 measure is around 80%, which is much higher than the standard value of 50%, and it implies that independent variables have the power to explain the dependent variable. Most of the estimates are consistent with the hypothesized relationships, and their tests of significance help to indicate their importance in explaining the adoption decisions of customers.

The parameter estimates for the model were evaluated at a 5% level of significance. The logistic estimate for the survey revealed that, apart from education, gender, and perceived trust, which were not found statistically significant, age, income, perceived usefulness, perceived ease of use, perceived risk, and perceived cost were found statistically significant in explaining cashless banking adoption. The positive sign and significance of variables such as income, perceived usefulness, and ease of use are important factors that will promote CBE customers' use of cashless banking services, while perceived risk and perceived cost are factors that hinder customers' adoption of cashless banking services in the commercial bank of Ethiopia.

Conclusion and Recommendations

This study sought to find out the factors that affect cashless services in commercial banks in Ethiopia. Results from the logistic regression revealed that there is a strong positive relationship between the adoption of cashless banking and income, perceived usefulness, and perceived ease of use. However, age, perceived risk, and perceived cost have a negative and significant influence on cashless banking adoption. The adoption of e-banking technologies in Ethiopia is, however, associated with some challenges. The study shows that lack of computer literacy, limitations in network distribution, limited knowledge of customers about cashless banking services, the absence of financial networks that link different banks, frequent power disruptions, and fear of risk aspects are the major challenges customers face for the adoption and use of cashless banking technology in CBE. The current cost available in Ethiopian commercial banks is found to be insufficient to influence the development of cashless banking services. From the above discussion, it is possible to conclude that cashless banking technology is not well adopted and developed in CBE, and its related technologies are still in their infancy stage in Ethiopia.

Based on the findings, we suggest the following policy implications: The results showed that 34% of the respondents are not currently using cashless banking services. This is a great marketing opportunity for businesses to reach those people with a broad range of financial services; however, it is critical for CBE staff to understand the perception and awareness of their customers. Therefore, to increase user adoption of cashless banking in CBE, the bank must positively influence their intention to accept the service by increasing their perception of its usefulness, affordability, effectiveness, convenience, trust in the service, and ease of use. Therefore, CBE

needs to direct more effort toward educating communities, especially potential customers, about the functionality, affordability, safety, and benefits of cashless banking services. Above all, the government should educate and inform the community on the workability and effectiveness of cashless banking technology. This will increase customer confidence levels. The government should support the banking sector by facilitating the development of sufficient infrastructure for the successful implementation and development of cashless banking services, and the central bank should issue suitable legal frameworks for the adoption of cashless banking.

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Appendices

Appendix A: summary statistic of demographic and socio economic characteristic of Respondents

Table A1: Summary statistics for education and age

	No. of observations	Minimum	Maximum	Mean	Std. Dev.
Age	312	18	61	35.34	10.799
Income per month	312	1029.00	37000.00	7035.5304	5954.54359

Table A2: Summary statics for categorical variables

Variable	Description	Frequency	Percent	Cumulative (%)
Education	12 and below 12 years of schooling	63	20.2	20.2
	Diploma	92	29.5	49.7
	degree and above	157	50.3	100
	Total	312	100.0	
Gender	Male	158	50.6	50.6
	Female	154	49.4	49.4
	Total	312	100	
Age	below 25 years	50	16	16
	25 to 40 years	159	51	67
	above 40 years	103	33	100
	Total	312	100	

Table A3: Summery statistics for cashless banking adoption

Do you use cashless banking?	Freq.	Percent	Cum.
Not Adopting	103	33.01	33.01
Adopting	209	66.99	100.00
Total	312	100.00	

Appendix B: The Relationship between Saving and Demographic and Behavioral Variables

Table B1: The relationship between adoption and education

Adoption	Education			
	Grade 12 and below	diploma	degree and above	Total
Not Adopting	41	43	19	103
Adopting	23	90	96	209
Total	64	113	115	312
	Pearson chi2 (2) = 50.0671		Pr = 0.000	

Table B2: Summery statics for adoption and income

Adoption	Mean	Std. Dev.	Freq
Not Adopting	5113.46	4612.81	103
Adopting	7982.76	6312.60	209
Total	7035.53	5954.54	312

Table B3: Cross tabulation for Adoption and Age

Adoption	Age			
	below 25	25 - 40	above 40	Total
Not Adopting	14	24	65	103
Adopting	36	135	38	209
Total	50	159	103	312
			Pearson chi2 (2) = 65.8344	Pr = 0.000

Table B4: Cross tabulation of cashless banking adoption and gender

Adoption	Gender			
	Male	Female	Total	%
Do not adopting	44	59	103	33
Adopting	114	95	209	67
Total	158	154	312	
% share adoption	54	45	100	

Pearson chi2(2) =   3.8611   Pr = 0.0496

Table B5: Gender Mean test for adoption as a group variable (*Two-sample t test with equal variances)*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Male	158	.721519	.0357744	.4496767	.6508579	.7921801
female	154	.6168831	0.0393026	.4877325	.5392373	.694529
combined	312	0.6698718	.0266659	.4710145	.6174033	.7223403
Diff	0.1046359	.0530906	.0001723	.2090995		

Diff = mean(male) – mean(female)		t = 1.9709
Ho: diff = 0		degrees of freedom = 310
Ha: diff < 0	Ha: diff! = 0	Ha: diff > 0
Pr(T < t) = 0.9752	Pr(|T| > |t|) = 0.0496	Pr(T > t) = 0.0248

Table B6: Mean test for adoption effectiveness as a group variable

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Cashless not effective	98	.6938776	.0467954	.4632508	.6010016	.7867535
Cashless is effective	141	.9929078	.0070922	.0842152	.9788861	1.006929
Combined	239	.8702929	.0217784	.336686	.8273898	.9131959
Diff		-.2990303	.0398954		-.3776251	-.2204354

Diff = mean (n eff.) – mean (is eff.)		t = -7.4954
Ho: diff = 0		degrees of freedom = 237
Ha: diff < 0	Ha: diff! = 0	Ha: diff > 0
Pr(T < t) = 0.0000	Pr(|T| > |t|) = 0.0000	Pr(T > t) = 1.0000

Table B7: Mean test for Cashless Banking Adoption for Customers Perception of Trust

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Not trustworthy	75	.68	.0542268	.4696174	.5719508	.7880492
trustworthy	164	.95	.0158329	.2027604	.926053	.9885812
Combined	239	.87	.0217784	.336686	.8273898	.9131959

Diff	.27	.0434447		-.3629041	-.1917301

diff = mean(no) -mean(yes)   t = -6.3832
Ho: diff = 0   degrees of freedom =   237

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.0000	Pr(T > t) = 0.0000	Pr(T > t) = 1.0000

Appendix C: Perception and Acceptance of cashless banking services

Table C1: Summery statistics for individual's perception on cash and non-cash payment

Do you think that there is significant difference between Cashless banking and physical cash payment?	Freq.	percent	cum.
No	89	37.24	37.24
Yes	150	62.76	100
Total	239	100.00	

Table C2: Rank of cashless banking services

Facets of cashless banking service	Mean	Std. Dev.	Mean rank
Card banking	0.90	0.288	1
Mobile banking	0.70	0.455	2
Internet banking	0.31	0.465	3
Agent banking/mobile money	0.29	0.455	4

Table C3: Mean rank of usage of cashless banking services

Cashless transaction services	Mean	Std. Dev.	Mean rank
Fund transfer	.6889952	.4640162	1
Local money transfer	.3205742	.4678178	2
Mobile pop up	.291866	.4557125	3
Buying goods and services	.1435407	.3514652	4
Bill payment	.138756	.3465217	5
Utility payment	.1339713	.3414393	6

Appendix D: Challenges in adoption of

Table D1: Tabulation for lack of computer literacy

Lack of computer literacy	Freq.	percent	cum.
No hindrance	23	7.37	7.37

Little hindrance	38	12.18	19.55
Some hindrance	9	2.88	22.44
Considerable hindrance	128	41.03	63.46
Great hindrance	114	36.54	100.00

Table D2: Tabulation for limitation in network infrastructure

Limitation in network infrastructure	Freq.	percent	cum.
No hindrance	16	5.13	5.13
Little hindrance	21	6.73	11.86
Some hindrance	3	0.96	12.82
Considerable hindrance	113	36.22	49.04
Great hindrance	159	50.96	100.00
Total	312	100.00	

Table D3: Tabulation for lack of awareness

Lack of awareness with cashless mode of payment	Freq.	percent	cum.
No hindrance	36	11.54	11.54
Little hindrance	31	9.94	41.03
Some hindrance	22	7.05	48.08
Considerable hindrance	131	41.99	90.06
Great hindrance	92	29.49	100.00
Total	36	11.54	11.54

Table D4: Tabulation for fear of risk aspects

fear of risk aspects	Freq.	percent	cum.
No hindrance	23	7.37	7.37
Little hindrance	41	13.14	20.51
Some hindrance	7	2.24	22.76
Considerable hindrance	123	39.42	62.18
Great hindrance	118	37.82	100.00
Total	312	100.00	

Table D5: Tabulation for frequent power disruption

frequent power disruption	Freq.	percent	cum.
No hindrance	15	4.81	4.81
Little hindrance	56	17.95	22.76
Some hindrance	15	4.81	27.56
Considerable hindrance	152	48.72	76.28

Great hindrance	74	23.72	100.00
Total	312	100.00	

Table D6: Tabulation for relatively high cost of internet and the service

Relatively high cost of the service	Freq.	percent	cum.
No hindrance	132	42.30	42.30
Little hindrance	152	48.71	91.01
Some hindrance	15	4.81	95.82
Considerable hindrance	7	2.24	98.08
Great hindrance	6	1.92	100.00
Total	312	100.00	

Table D7: Tabulation for absence of financial networks that links different banks

absence of financial networks that links different banks	Freq.	percent	cum.
No hindrance	58	18.59	18.59
Little hindrance	58	18.59	37.18
Some hindrance	24	7.69	44.87
Considerable hindrance	144	46.15	91.03
Great hindrance	28	8.97	100.00
Total	312	100.0	