A Model for Technology Adoption, Financial Literacy, and Growth of Internet Banking in Centenary Bank Branches in Uganda

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Abstract

This study examined the relationship between technology adoption, financial literacy, and the growth of Internet banking in Centenary Bank branches in Uganda and it specifically based on three objectives to examine the relationship between technology adoption and Internet banking, financial literacy and the growth of Internet banking, and to examine the combined effect of technology adoption and financial literacy on Internet-banking A cross-sectional research and quantitative design was adopted with a sample size of 108 employees from a population of 150 determined by Krejcie and Morgan's (1970) table. The data was tested for reliability and validity, analysed using SPSS v23 and results presented based on the study objectives. Findings revealed a significant and positive relationship between technology adoption and Internet banking given by (r=.380** and p<.01). Further findings indicated that there is a positive significant relationship between financial literacy and growth of Internet banking given by (r=.591** and p<.01). Overall technology adoption and financial literacy explain 34.5% of the variance in Internet-banking. In addition, financial literacy was found a stronger predictor (Beta = .539, sig. <.000) of Internet-banking compared to technology adoption (Beta = .101, sig. <.001). Therefore, recommendations are detailed in the main document for further guidance.

Keywords: Technology adoption, financial literacy, Internet banking
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Introduction

Globally, the banking industry has realized unexpected outcomes that came with associated post-crisis in the era of 2012 to 2015 (Field, 2022). These events led the banking industry to undergo a period of disturbance to realize the trust of their customers who were greatly affected by the negative financial crisis. There was a slowdown in industrial growth and development due to the effects emanating from the growth rate of the top 1000 banks worldwide (Kose & Ohnsorge, 2024). This stagnation in the growth of the banks was estimated at 2.7% which saw a double slump before the crisis during the years of 2014 to 2016. Another issue noted, was the associated risks that would affect profitability; which required mitigation and management to ensure the recovery of the banks. The risk management strategy enhanced stability in the pre-crisis era which registered a growth of 3.8% in the era between 2007 and 2010 (De Bonis *et al.,* 2023). Therefore, this brought about confidence among the bank clientele that demanded effective financial services. Globalization and its advantages that involve the use of technology especially Information Technology (IT) met with swift changes in clientele needs and timely accuracy in global

banking operations. The introduction and utilization of IT in global banking operations enabled the realization of 3.8% in the era of 2009-2013 which realized profits of $63.6 billion (Jakar & Rosentraub, 2021).

Information and Communication Technology (ICT) has become crucial for enhancing efficiency and effectiveness in many sectors, including banking (Shalaby, 2024). The banking sector leverages technology to serve clients more quickly and efficiently (Anvarovich, 2024). E-banking provides multichannel service delivery, including ATMs, computer banking, and card-based banking (credit/debit/smart cards), facilitating electronic transactions through electronic data interchange (Nazaritehrani & Mashali, 2020). Bank of America was the first to attract 3 million online banking customers in 2001 (Schreieck *et al.,* 2024).

In Africa, Standard Bank and the Central Africa Building Society introduced significant electronic systems and installed the first ATMs. In Uganda, Standard Chartered Bank introduced electronic banking in 1997, easing access to cash via VISA credit cards. The Bank of Uganda implemented electronic fund transfers in 2007 to reduce cash transactions and improve payment systems (Atukunda *et al.,* 2024). Despite these advancements, Internet banking adoption remains low, at only 39% (Chanaba, 2020), partly due to limited financial literacy among bank customers, hindering technology adoption in their businesses.

The Technology Acceptance Model (TAM) by Davis (1989) explains that technology adoption depends on users' perceived usefulness and ease of use. TAM adequately explains the slow adoption of technologies and predicts user acceptance (Yang, *et al.,* 2023). However, in developing countries, TAM overlooks structural essentials and costs, which are crucial for technology adoption (Al-Shami *et al.,* 2022). The Theory of Planned Behaviour (TPB) suggests that technology adoption is influenced by subjective norms, behavioural intention, beliefs, and evaluations (Lihua, 2022). Financial literacy remains a significant issue in developing economies, drawing increased interest due to rapid changes in the finance sector (Barajas *et al*., 2020).

Internet banking in Uganda is getting more recognition as well as acceptance by both banks and customers. Financial Sector Development Uganda (2018) revealed through its attitudinal analysis that nearly 90% of banked Ugandan adults are prepared to learn as well as use technology for payments. On the contrary, over three-quarters of this population prefer using physical cash to make payments for products and services (Ghosh, 2024). In a bid to guide the transition from traditional banking to electronic banking, the Bank of Uganda created a unit (The National Payment System Secretariat) (NPSS) in 1998 which created the Uganda National Inter-Bank Settlement (UNIS) system a real-time gross transfer that handles large payments. These were efforts to transition towards digitized banking in Uganda. Bank of Uganda is one of the banks that promoted the use of Internet banking among its customers in Uganda. The bank launched Internet banking in 2007, however, the degree of adoption was low with 400 of its 28,000 customers in Kampala District using Internet banking actively.

In 1993, Centenary Rural Development Bank Ltd became a full-service commercial bank with the vision "To be the best provider of Financial Services, especially Microfinance in Uganda." Today, it is Uganda's leading microfinance commercial bank, serving 2.3 million customers, with an asset base of UGX 4.7 trillion, 80 branches, 5,200 agents, 192 ATMs, mobile banking, and digital platforms (Centenary Group, 2020). The bank upholds core values of Superior Customer Service, Integrity, Teamwork, Professionalism, Leadership, Excellence, and Competence.

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Centenary Bank offers various electronic banking services, including Cente Mobile, Cente Points, E-NSSF Payments, E-Tax Payments, PC banking, Point of Sale, US Visa Application Payments, RTGS, EFTs, and mobile money transactions. Their "New Business Online" product allows clients to access their bank portfolio and monitor cash flows from anywhere with an internet connection, offering services such as Cente Mobile Loan, merchant services, agent banking, POS service, and Visa debit card.

A study by Chanaba (2020) on Internet banking adoption in Ugandan commercial banks revealed that only 39% of customers use Internet banking, leaving 61% not utilizing these services. This slow adoption trend prompted research into the relationship between technology adoption, financial literacy, and the growth of Internet banking at Centenary Bank. Customers in the banking sector have not fully embraced Internet banking, preferring to queue rather than use online services. In Uganda, only 39% of customers have adopted Internet banking (Chanaba, 2020). This low adoption rate, including at Centenary Bank, is due to fraud concerns and a lack of financial literacy (Bank of Uganda, 2017). This slow adoption has hindered the banking sector's development.

Many banks, including Centenary Bank, have implemented Internet banking to enhance customer service efficiency (Kyambade, *et al.,* 2023). Centenary Bank has developed websites, mobile applications, and financial literacy programs to educate customers on Internet banking benefits. Despite these efforts, usage remains low, attributed to the slow rate of technology adoption and financial literacy (Kass-Hanna, *et al.,* 2022). This study examines the relationship between technology adoption, financial literacy, and the growth of Internet banking at Centenary Bank branches in Uganda. This paper aims to examine the relationship between technology adoption, financial literacy, and the growth of Internet banking in Centenary Bank branches in Uganda. This paper has three main objective objectives which examine, *the relationship between technology adoption and Internet banking, the relationship between financial literacy and the growth of Internet banking, and the combined effect of technology adoption and financial literacy on Internet banking.*

Theoretical Literature Review

A variety of studies have found that different acceptance studies apply the UTAUT model in different fields. Further, there are many studies applying the UTAUT model in the banking industry because the use of Information and Communication Technology (ICT) in the banking industry across the world has become a relevant part of banking operations. The research on individual acceptance and use of information technology (IT) is an established part of information systems research. The UTAUT model that aims to explain technology acceptance is founded on eight technology acceptance theories (Nikou, 2024). The UTAUT model draws on the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model, the Theory of Planned Behaviour (TPB), the combined TAM and TPB, the model of Personal Computer Utilization, the Innovation

According to Kagoya and Mbamba (2021), the Unified Theory of Acceptance and Use of Technology (UTAUT) was developed to address the limitations of the Technology Acceptance Model (TAM) as well as other models used to study information system and technology adoption. The authors (Kagoya & Mbamba, 2021) further highlight that the variance in intention to use explained by the contributing models ranged from 17 to 53%. However, the UTAUT model performed better in terms of variance in intention to use compared to any of the eight technology acceptance models. According to Kagoya, *et al.,* (2021), the UTAUT model has four variables that serve as direct determinants of the acceptance and usage behaviour of users. These include; Performance Expectancy (PE),

Effort Expectancy (EE), Social Influence (SI), and Facilitating Condition (FC). The key moderators for these constructs include; Gender, Age, Voluntariness and Experience.

Performance Expectancy describes the degree of belief of an individual that the use of technology will assist them in improving their job performance. The factors contained in Performance Expectancy are perceived usefulness, extrinsic motivation, job fit, relative advantage, and outcome expectation (Kaur & Arora, 2023). The influence of PE on technology acceptance is moderated by gender and age. Effort expectancy explains the degree of ease associated with the use of a technology. Effort Expectancy is composed of the following factors; perceived ease of use, complexity, and ease of use with the moderating variables being gender, age, and experience. Social influence describes the degree of importance perceived by an individual on the belief of other people for them to use a new technology. Factors that affect social influence include; subjective norms, social factors, and image. These factors/variables are moderated by gender, age, voluntariness, and experience. The facilitating condition describes the degree of belief of an individual that the existence of organizational and technical structure supports the use of technology. The variables for the facilitating condition include; behavioural control, facilitating condition, and compatibility while the moderating variables are age and experience (Kagoya, *et al.,* 2021).

The Theory of Planned Behaviour (TPB) is an extension of the Theory of Reasoned Action (Kagoya, *et al.,* 2021), which has its main goals as the prediction and understanding of human behaviour. The TPB postulates that behavioural intention to use is jointly determined by three factors (attitude towards use, subjective norms, and perceived behavioural control). Each antecedent is in turn generated by several beliefs and evaluations. Attitude is an individual's overall positive or negative evaluation of a particular behaviour after the evaluation of the perceived consequences of an act (Singh *et al.,* 2023). The TPB predicts that the more favourably an individual evaluates a particular behavior, the more likely the individual will intend to perform that behaviour. Subjective norms are the extent to which an individual feels that significant others want him/her, to perform the behaviour in question (Jain, 2020). The more an individual perceives that others significantly think he/she should engage in the behaviour, the greater the individual's level of motivation to comply with others. The model is further conceptualized as shown below:

In the customer adoption setting for Internet banking services, TRA makes it clear that customers will take a new technology based on their attitude together with the subjective norms. The TAM suggests that customers are more willing to accept Internet banking if the platform is perceived to be easy to understand, learn, or operate, and is perceived to have associated benefits and time costs, including maximizing their productivity, efficiency, and customer satisfaction and minimizing the time to complete a task.

To apply these theories to the technology adoption context, it is necessary to measure beliefs regarding the use of technology, rather than the technology itself (Granić, 2024). In summary, the above two theories together suggest that technology use and/or adoption is largely dependent on employee perceptions about the technology itself such that, if their perceptions are favourable, then the bank customers are likely to be inclined to adopt the technology and vice-versa. That means that, before banks come up with new technology such as Internet banking, it is important that customers' views are sought (Melnyk, 2024).

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Empirical Literature Review

Internet banking refers to the use of banking services through the computer network (the Internet), while providing a wide range of benefits to both financial institutions and clients due to more accessibility and user-friendly use of the technology (Alqud et al., 2023; D'Andrea & Limodio, 2024). With Internet banking, customers can perform a wide range of transactions electronically for instance paying bills, and fund transfers among others. The primary advantage of Internet banking is to save time and cost. Internet banking allows consumers easier access to their bank accounts and also time-saving (Kagoya & Dev, 2016). Besides the effect of attitude risk and customer knowledge, below is a detailed analysis of why bank customers may/may not adopt banking as a delivery channel for their banking needs (Kaur & Arora, 2023).

The type of account being operated by the customer influences the adoption of electronic banking especially where the volume of transactions is high (Teka, 2020). Company accounts always have big and many transaction amounts and stakeholders normally want to be informed instantly of the transactions that are happening on the accounts at any moment irrespective of location, place, and time. Companies like Petro Uganda, Vivo Energy, Kasese Nail Company Limited have signed up for Internet banking to enable them to keep track of the transactions and real-time reconciliation of bank statements. When cash is deposited by various customers in different locations, the accounts department gets to know instantly and the deliverables are effected. When Telegraphic money transfers are made, the stakeholders are informed of the debits made and reconciliation is instant. It is commonly accepted that individuals more often perform some act in response to social pressure that might appear separately/jointly from friends, family members, colleagues, or agents of organizations (Laursen & Veenstra, 2021).

In summary, decisions to accept any technology need an equal consideration of the individual's prerequisites as well as the groups of which one is a member. Kagoya and Mkwizu (2022) viewed subjective norms as including two influences: (1) peers' influence and (2) superiors' influence. In the financial services industry, perspectives of influential people in society generally affect the adoption of IT (Kagoya, et al., 2021) meaning that peers and superiors have a profound effect on technology adoption. This means that young people will generally influence other young people to use the service, as per the Theory of Planned Behaviour.

Prior research on age difference reported that increasing age is correlated with higher computer anxiety, unfavourable to Perceived Usefulness, and lower attitude towards usage (Hofer & Hargittai, 2024) and acceptance behaviour. The rationale for control beliefs could be that older people are less likely to have computer experience and be less open to change, hence being more susceptible to computer anxiety (Yap et al., 2022). Amiri, et al., (2023) found that the importance of having a friendly supervisor and peers increases with age. Recent literature for instance; Offermann et al., (2024) suggest that age together with gender can exhibit a simultaneous effect on an individual's acceptance behaviour.

Relationship between Technology Adoption and Internet Banking

Technology adoption plays a vital role in implementing Internet banking services (Kagoya & Dev, 2016). The Unified Theory of Use and Acceptance of Technology (UTAUT) model has recently been used by various authors for instance Kagoya and Mbamba (2020) in the different ICT-related studies. Kagoya and Mkwizu (2022) defined perceived usefulness refers to the degree to which a person believes that using a particular system would enhance his/her

job performance; while perceived ease of use is the degree to which a person believes that using a particular system would be free from effort".

Researchers claimed that PU is a significant factor that affects user's acceptance of IT (Yahya *et al.,* 2024). In the context of Internet banking, if customers believe that online and mobile banking services are useful, they will accept them as alternative options to traditional banking (Mir, *et al.,* 2023). According to Iqbal, *et al.,* (2023), the most useful feature of online banking is its 24-hour availability. Law (2024) supported this claim and highlighted that the ease of processing transactions and increased financial transparency were additional benefits of online banking usefulness. KA and Subramanian (2024) found that customers perceived mobile banking as useful because it was low-cost, convenient, and easy to conduct banking. This study adopted the Law (2024) definition of PU, which is the degree to which a bank's customer perceives that the use of a business application makes it easier to purchase or sell financial products. Bank leaders could benefit from increased financial performance with reduced overhead expenditures associated with facilitating branch-based banking (Law, 2024). In the context of Internet banking, PEOU means hassle-free use of online and mobile banking services while finding the experience to be enjoyable (Limbu, 2024). Limbu (2024) and Gosh (2024) stated that, if users' perceived e-banking as easy to use, they would be more likely to adopt the services. Gosh (2024) supported this claim by noting that, when customers perceive mobile services to be easy, they feel less threatened while using the applications.

In previous studies on TAM, researchers found that PEOU had a direct positive impact on the adoption of e-banking or predicted customer adoption of e-banking (Karki, et *al.,* 2024). Other researchers did not identify a significant relationship between PEOU and technology adoption. To increase the use of mobile banking, researchers recommended that bank leaders and developers should design applications with user-friendly interfaces, graphical layouts, and intuitive navigation to address potential user deterrents to using small screens to perform banking activities (Limbu, 2024). In their study, Bhat, et *al.,* (2024) stated, that the perceived ease of use significantly influences the intention to use Internet banking services. This positive attitude to using Internet banking services is founded on the reasoning that individuals may learn to use Internet banking quickly and find it easy to use.

Relationship between Financial Literacy and Internet Banking

Internet banking has been helping to reduce the lack of access to and cost of formal financial services in developing countries (Giron *et al.,* 2022). But a large number of people is financially illiterate, not only in remote and rural areas but also in urban and semi-urban vicinities (Omar & Inaba, 2020). The case of financial literacy is worse in some African countries; for example, a comprehensive study was conducted about deposit account ownership, and out of the seven countries with less than 100 accounts per 1000 individuals, five are in sub-Saharan Africa (Lusardi, 2019). The status of financial literacy in Africa studied and based on analysis of the Global Findex data (Andreou & Anyfantaki, 2021) also revealed that many adults in Africa are financially excluded albeit various efforts are ongoing to increase access to formal financial services.

The importance of financial literacy and its positive externalities are substantiated by a growing body of studies that find that it is associated with better financial decision-making (Lusardi, 2019). Individuals with a higher level of financial literacy are less vulnerable to

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being exploited or deceived (Andreou & Anyfantaki, 2021), are less prone to over-indebtedness are better in retirement planning, participate more often in financial markets, and have higher returns on savings accounts (Lusardi, 2019).

The global financial crisis highlighted the lack of financial knowledge around the globe (Yang, ey *at al.,* 2023) and Cyprus was among those countries that were hit the hardest during the recent economic and banking crisis in 2013. Against this background and in the wake of the economic turmoil, the important question thus arises whether Cypriot consumers have significantly stepped up their efforts to improve their financial literacy levels in line with other leading European countries. This kind of spillover effect is motivated by evidence showing that people are learning through experience, especially when it adversely affects their financial well-being (Lusardi, 2019).

Unfortunately, recent evidence among students revealed the worrisome issue of inadequate basic financial knowledge in Cyprus (Andreou & Anyfantaki, 2021). In general, contrary to the range and depth of studies already conducted in other European countries to measure financial literacy, there has been very little effort in the case of Cyprus. Thus, further research on measuring financial literacy in Cyprus for the adult population is necessary to better understand and subsequently address the problem, especially because financial illiteracy is detrimental to the long-term well-being of individuals (Andreou & Anyfantaki, 2021).

The Combined Effect of Technology Adoption and Financial Literacy on Internet Banking

Some research was focused on the impact of financial literacy on Internet usage. Yang, *et al.,* (2024) found that financial knowledge can be regarded as a potential risk factor for Internet shopping. The results show that financial literacy is significantly and negatively correlated with Internet shopping by affecting the usage of the Internet. Lusardi (2019) found that those who display high levels of advanced literacy are much more likely to read newspapers and magazines, consult financial advisers, and seek information on the Internet. Obeng-Ayisi *et al.,* (2022) investigated why consumers are not using Internet banking. Findings revealed that lack of knowledge is an important factor that affects the adoption of Internet banking. Furthermore, Nguyen (2022) found that financial knowledge is significantly positively related to the probability of usage of digital financial services.
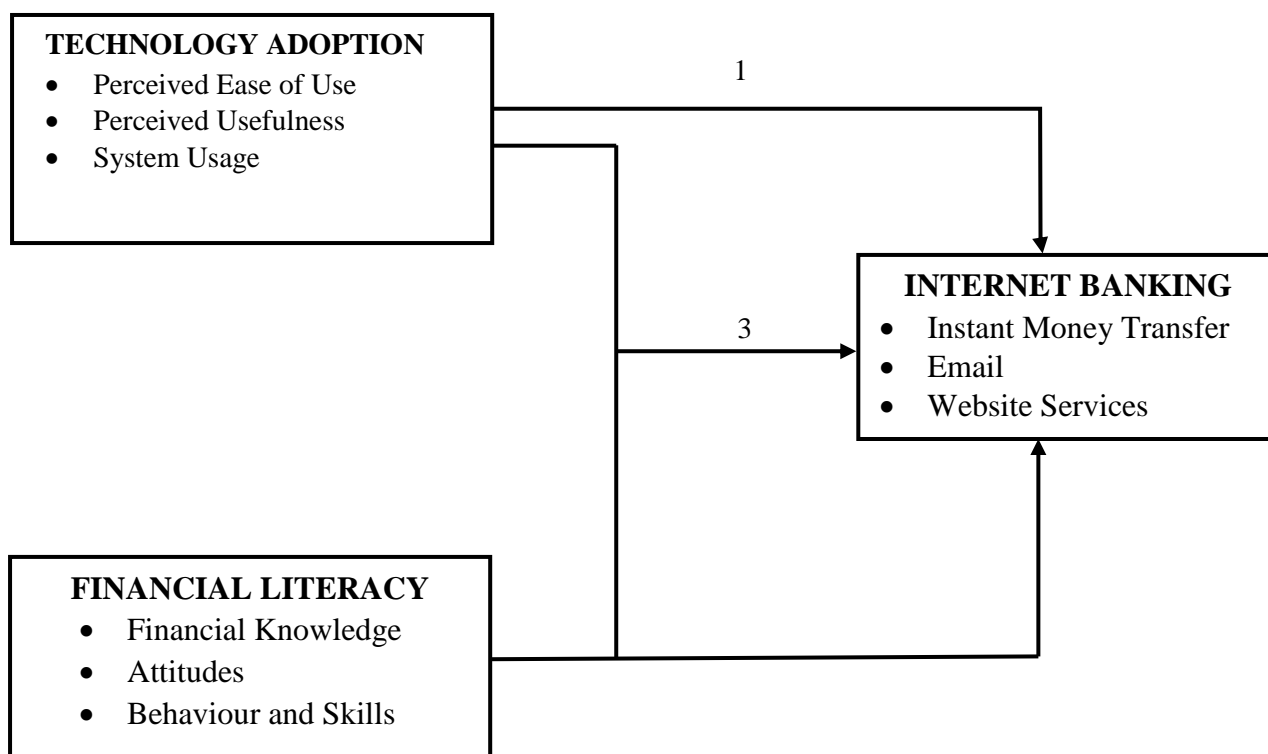
Figure 1: A conceptual framework for internet banking
Source: Researchers' contribution (2023)

Explanation of the Conceptual Framework

This model was based on three variables; technology adoption and financial literacy as the independent variables, growth of Internet banking as the dependable variable. According to the model, there are technology adoption components (perceived usefulness and perceived ease of use) that must be present for bank customers to adopt technology-based services. In this framework, financial literacy is given in terms of knowledge, attitudes, behaviour, and skills. The growth of Internet banking is in terms of the volume of transactions, types of transactions, and value of transactions. As envisaged in the conceptual framework, the variables are interrelated.

Methodology

The study population consisted of 150 respondents in top management positions in 25 Centenary Bank branches in Kampala (CBBK) (Centenary Bank human resource manual, 2020). These consisted of six staff members in the positions of a bank Manager, Assistant Branch Manager, Customer service consultant, Head of loans, Branch supervisor, and Chief Teller. These staff were chosen because they have they oversee the implementation of Internet banking in the bank**.**

Using the Krejcie and Morgan (1970) Table of sample size determination, 108 respondents were selected for this study via a purposive sampling technique based on their

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bank positions. According to Jonh and Coulter-Kern (2024), aims at increasing the depth of understanding of the subject matter and it also enables the researcher to select respondents that are most likely to yield appropriate and useful information. In this study, six staff members were in management positions including Bank Manager, Assistant Branch Manager, Customer service consultant, Head of loans, Branch supervisor, and Chief Teller. The respondents were considered because; they have a high level of personal interaction and access to customers' information (Martins, *et al.,* 2024). This, therefore, implies that this study had at least four (4) to five (5) respondents from each of the 25 bank branches in Kampala in a managerial position.

The research was based on both secondary and primary data. Secondary data was collected from both internal and external sources. Internal sources of secondary data include bank reports, external sources of secondary data will include journals, dissertations, and published research papers which provide literature presented in this proposal. Primary data which is original in nature was from respondents who are the staff of the Centenary bank branches. The information was directly obtained from these targeted respondents. Reliability is dependability or trustworthiness and in the context of the measuring instrument, it is the degree to which the instrument consistently measures whatever it is measuring (Raykov *et al.,* 2023).

Findings of the Study

Of the 108 usable questionnaires collected from respondents, female respondents were 56 (or about 52%) while male respondents were 52 (or about 48%). This means that the CBBK employs both male and female employees in their Internet-banking operations as depicted in Table 1.

Table 1 Gender of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	52	48.1	48.1	48.1
	Female	56	51.9	51.9	100.0
	Total	108	100.0	100.0	

Source: Primary data (2022)

Age of the Respondents

For the age of the respondents, the majority were between 20– 29 years of age (50%), followed by those between 30-39 years (27%), 40-49years (14%) and the minority were 50 & above years of age (3%). This shows that most of the employees involved in Internet-banking operations are of active age. This was an indication that the respondents had varied age distribution and therefore gave different views on Internet-banking within CBBK as shown in Table 2.

Table 2: Envisaging age of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-29	54	50.0	50.0	50.0
	30-39	37	34.3	34.3	84.3
	40-49	14	13.0	13.0	97.2
	50 and above	3	2.8	2.8	100.0
	Total	**108**	**100.0**	**100.0**	

Source: Primary data (2022)

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The Education Level of the Respondents

The majority of the respondents had attained degrees as their highest level of education (85%). Furthermore, the results showed that respondents with a master's level of education comprised 15%, of the sample. All of the respondents were literate, an indication that respondents did understand the study variables of technology adoption, financial literacy, and Internet banking (see Table 3):

Table 3: Respondents' Levels of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Degree	92	85.2	85.2	85.2
	Masters	16	14.8	14.8	100.0
	Total	**108**	**100.0**	**100.0**	

Source: Primary data, 2022

Period Working with the Bank

The results in Table 4 show that the majority of 52% of the respondents have been associated with this company for 1-5 years, 31% have been there for 6-10years, 14% have worked for 11-15 years, 3% have worked for 16-20 years and 1% has worked for more than 20 years. This implies that the majority of the respondents had spent enough years with the Centenary Bank thus they were in a better position to provide Information about technology adoption, financial literacy, and Internet banking (see Table 4)

Table 4: Respondents' period working with the organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	56	51.9	51.9	51.9
	6-10	33	30.6	30.6	82.4
	11-15	15	13.9	13.9	96.3
	16-20 years	3	2.8	2.8	99.1
	Over 20 years	1	.9	.9	100.0
	Total	**108**	**100.0**	**100.0**	

Source: Primary data (2022)

Descriptive Statistics

The summary descriptive statistics of the independent and dependent variables included in the analyses are presented in Table 5. This study's dependent variable is Internet-banking while the independent variables are technology adoption and financial literacy. The purpose of descriptive statistics is to check whether the calculated means represent the observed data, that is, whether the mean is a good replica of reality (Amrhein, *et al.,* 2019). The descriptive

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statistics of variables cover means, standard deviations, minimum and maximum values as given in Table 5:

Table 5: Envisaging descriptive statistics

	N	Min	Max	Mean	Std. Deviation
Perceived usefulness	108	1.00	5.00	4.3898	.31473
Perceived ease of use	108	1.00	5.00	3.2562	.51278
System usage	108	1.00	5.00	4.0347	.39743
Technology adoption	**108**	**1.00**	**5.00**	**4.0171**	**.34878**
Financial knowledge	108	1.00	5.00	4.0657	.43474
Attitude	108	1.00	5.00	4.0519	.44522
Behaviour and skills	108	1.00	5.00	3.9954	.55638
Financial literacy	**108**	**1.00**	**5.00**	**4.0482**	**.31181**
Growth of Internet banking	**108**	**1.00**	**5.00**	**4.0454**	**.38094**
Valid N (listwise)	108				

Source: Primary data, (2022*)*

Results in Table 5 above indicated that the mean values for technology adoption, financial literacy, and growth of Internet banking are 4.017, 4.048, and 4.045 respectively. The standard deviations for technology adoption, financial literacy, and growth of Internet banking are 0.349, 0.312, and 0.381 respectively. As standard deviations relative to mean values are small, the calculated means highly represent the observed data (Kadlec, *et al.,* 2023).

SD is the extent to which the views obtained from the respondents vary from the mean scores. It implies that a higher SD had varying opinions towards the given response (SD above 1), and when the SD is below 1 closer to 0, it means uniformity in the opinions provided in the study. A mean above 3 indicates that the respondents agreed to the question asked. In this study, all respondents agree that DFS adoption and trust are important in influencing financial inclusion given that their means are all above 3.00 and all the standard deviations are below 1.00. The SD below 1.00 indicated uniformity in the response which implies that all respondents agree that technology adoption and financial literacy play a major role in improving the growth of Internet banking among CBBK.

Correlation Results

The correlation results are presented in Table 6. Pearson's correlation coefficient analysis was conducted to establish the relationships between the independent variables and the dependent variable. The intention was to evaluate whether linear relationships existed between independent variables (technology adoption and financial literacy) and the outcome variable (growth of Internet banking). Pearson's correlation coefficient, r, was used because it is a parametric statistic and requires interval data for both variables (Ravid, 2024). As a result, bivariate-correlation analyses were performed and Pearson correlation coefficients were generated to measure the direction and size of the relationship between the study variables.

Table 6: Correlation analysis between the independent and dependent variable

	1	2	3	4	5	6	7	8	9
Perceived usefulness (1)	1								
Perceived ease of use (2)	.395**	1							
System usage (3)	.357**	.709**	1						
Technology adoption (4)	.654**	.923**	.818**	1					
Financial knowledge (5)	.462**	.537**	.528**	.619**	1				
Attitude (6)	-.192*	.276**	.400**	.208*	.101	1			
Behaviour and skills (7)	-.090	.163	.178	.116	-.026	.451**	1		
Financial literacy (8)	.127	.524**	.598**	.518**	.633**	.787**	.551**	1	
Growth of Internet banking (9)	.124	.380**	.500**	**.380****	.139	.578**	.562**	**.591****	1

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

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Primary data, 2022

The Relationship between Technology Adoption and Internet Banking

Table 6 results indicate a positive significant relationship between technology adoption and growth of Internet-banking in CBBK (r=.380** and p<.01). This means that a unit change in technology adoption will lead to a 38% improvement in Internet-banking   Thus, a positive change in technology adoption translates into a positive improvement in Internet-banking among CBBK. Also, the components of technology adoption (perceived usefulness, perceived ease of use, and system usage) when viewed independently, significantly affect the growth of Internet-banking among CBBK positively. Therefore, if employees in Centenary Bank branches of Kampala adopt digital technology in providing services, customers will be forced to use Internet-banking platforms. Therefore, study objective 1 examines the relationship between technology adoption and Internet-banking.

The Relationship between Financial Literacy and Internet Banking

Table 4.6 results indicate a positive significant relationship between financial literacy and the growth of Internet-banking in CBBK (r=.591** and p<.01). This means that a unit change in financial literacy will lead to a 59.1% improvement in Internet-banking within CBBK. Also, the components of financial literacy (Financial knowledge, Attitude Behaviour, and skills) when viewed independently, significantly affect the growth of Internet banking positively. Therefore, for Internet banking to grow within CBBK, there is a need for improvement in the financial knowledge of employees, changing employees' attitudes and improving their behaviours and skills, hence achieving study objective two.

Regression Results

Regression is the predictive potential of the independent variables on the dependent variable. The regression model was used to determine the extent to which technology adoption and financial literacy predict the growth of Internet-banking among CBBK. The results are presented in Table 7. *Adjusted R^2* gives the idea of how well the regression model generalizes

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the study variables and ideally every researcher would like its value to be the same or very close to the value of R2. Table 7 shows the results from the regression analysis.

Table 7: Envisaging the regression results of the study variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.936	.422		2.215	.029
Technology adoption	.110	.100	.101	1.102	.273
Financial literacy	.659	.112	.539	5.896	.000

R=.598, R^2=.357, Adjusted R^2=.345, F=29.188, Sig=.000, e=.30829

a. Dependent Variable: Growth of Internet banking

Source: Primary Data (2022)

The results in Table 7 show that technology adoption and financial literacy predict 34.5% of the variance in the growth of Internet banking among CBBK (Adjusted R Square =.345). This means that there are other factors that explain the remaining 65.5% of the variance in the growth of Internet banking among CBBK. It was also noted that financial literacy (Beta = .539, sig. <.000) is a better predictor of the growth of Internet-banking among CBBK than technology adoption (Beta = .101, sig. <.001). This implies that CBBK should improve the financial literacy of their employees to enhance the growth of Internet-banking. The regression model in this case was statistically significant (sig. <.000).

Discussion of Findings

Findings envisaged a positive and significant relationship between technology adoption and the growth of Internet-banking in CBBK. It is thus crucial for CBBK to adopt technology through perceived usefulness, perceived-ease of use, and system usage to improve Internet-banking. In this study, it is evident that employees at CBBK believe that, using Internet banking will improve their work quality, accomplish more tasks quickly, support critical staff jobs aspects, increase staff productivity, be easy to use, and do what they want to do. Respondents also agreed that Internet banking is clear and understandable, have sufficient knowledge regarding Internet-banking functions operations, enjoy learning new Internet banking functions, and easy to save and edit entries when using Internet banking

The study findings are consistent with the studies of Afsay, *et al.,* (2023), who claimed that, PU is a significant factor that affects user acceptance of information technology. In the context of Internet banking, if customers believe that online and mobile banking services are useful, they will accept them as alternative options to traditional banking (Lee & Chen, 2022). These findings are also supported by the study of Ahmad, et *al.,* (2020) who found that PEOU had a direct positive impact on the adoption of e-banking or predicted customer adoption of e-banking. Furthermore, a study conducted by Ahmad *et al.,* (2020) revealed that perceived ease of use and perceived usefulness are not only antecedents to e-banking acceptance, but they are also factors to retain customers to the use of e-banking systems such as; organizational reputation, perceived risk, and trust. Lastly, in their study, Alquda *et al.,* (2023) found out that, the perceived ease of use significantly influences the intention to use Internet banking services. Thus, the adoption of technology through perceived usefulness, perceived ease of use, and system usage can help to improve Internet banking. In this study, the researchers reaffirm that there is a positive relationship between

technology adoption and the growth of Internet banking. On the contrary, other previous authors' results are contradictory or had a negative influence (such as D'Andrea & Limodio, 2024).

The study findings indicate that there is a positive and significant relationship between financial literacy and the growth of Internet banking in CBBK. It is thus vital for CBBK to develop the financial knowledge, attitude, behaviour, and skills of their employees to enable them to efficiently use bank systems, and guide clients on the usage of Internet banking, thus growth of Internet banking In this study, it is evident that employees of CBBK are aware of the financial opportunities, make informed financial decisions, regularly attend savings seminars/workshops, possess realistic income aspirations and wise financial-habits, confident in financial decisions-making, concrete financial goals towards which their working. Employees have basic numeracy skills on how to calculate savings, can assess the risks of savings products before making a final decision and possess a range of financial analytical skills. Thus, the employees are financially literate and this influences the growth of Internet-banking

The study findings are about the empirical study of Obeng-Ayisi *et al.,* (2022) who investigated why consumers are not using Internet banking. This investigation found that the lack of knowledge is an important factor that affects the adoption of Internet banking. Furthermore, Nguyen (2022) found that financial knowledge is significantly positively related to the probability of usage of digital financial services. Lusardi (2019) added that the importance of financial literacy and its positive externalities are substantiated by a growing body of studies that found out that, it is associated with better financial decision-making. These findings also agree with the literature that individuals with a higher level of financial literacy are less vulnerable to being exploited or deceived (Mao & Liu, 2023), are less prone to over-indebtedness (Maria, 2023), are better in retirement planning, participate more often in financial markets and have higher returns on savings accounts.

Conclusion

This study examined the relationship between technology adoption, financial literacy, and the growth of Internet-banking in Centenary Bank branches in Uganda. Overall, the results indicate that technology adoption and financial literacy predict 34.5% of the variance in Internet banking in Centenary Bank branches in Uganda. Additionally, technology adoption and financial literacy are significantly related to Internet-banking. Results envisaged that financial literacy is a better predictor of the growth of Internet-banking among CBBK than technology adoption, hence the need to address this vital issue.

Recommendations

The findings of the study have indicated that financial literacy is a stronger predictor of Internet banking, therefore the management of Centenary Bank (CB) while recruiting staff should emphasize the financial literacy of their employees in terms of financial knowledge, attitude, behaviour, and skills since they contribute to the growth of Internet-banking within

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the branches. CB should improve the degree to which employees believe that using a particular system would enhance their job performance thus the growth of Internet-banking. CBBK should invest development and training of their staff to attain financial knowledge and improve their attitude, behaviours, and skills geared towards the growth of Internet-banking. Financial institutions need to focus on increasing the adoption of technologies in their operation to be efficient, thus the growth of Internet-banking. The Bank of Uganda should set policies aimed at improving the growth of Internet-banking in Uganda by making individuals aware of the Internet services and encouraging their adoption. Bank customers should be open-minded and willing to any information relating to access, usage, and quality of Internet-banking to improve its growth within commercial banks in Uganda.

Limitations and Future Study Areas

This study is limited to a quantitative approach, therefore a qualitative study should be conducted to examine technology adoption and financial literacy on Internet banking in Centenary Bank branches in Kampala (CBBK). This will aid in obtaining the respondent's opinions on the study variables. Based on the fact that this study was limited to employees in CBBK, whose population is small, hence further research should use a mixed research approach and a comparative study for a wider generalisation of findings. Additionally, this study was limited to a cross-sectional survey design which aimed at gathering data at a point in time. However, to obtain the exact picture of technology adoption and financial literacy on Internet banking in CBBK, a longitudinal study is more pertinent. Finally, the model was limited to a few predictors which explained that technology adoption and financial literacy predict 34.5% of the variance in the growth of Internet banking among CBBK (Adjusted R Square =.345), hence failing to explain the remaining 65.5%. Therefore, future researchers should use other predictors to predict the variance in the growth of Internet-banking among Centenary Bank branches in Uganda.

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