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THE PERCEPTION OF BANK EMPLOYEES TOWARDS COST OF ADOPTION, RISK OF INNOVATION, AND STAFF TRAINING'S INFLUENCE ON THE ADOPTION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN THE RWANDAN COMMERCIAL BANKS

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ABSTRACT

The developments in information technology are radically changing the platform of business transactions in Rwanda. However, the adoption and usage is essentially an aftermath of banks' perception and willingness to embrace and internalize change. This assumption was investigated among the commercial banks in Rwanda with regard to ICTs' cost of adoption, risk of innovation, and staff training. This research was perceptual-tailored and relationship-oriented; identifying the underpinning elements and pinpointing relationships on how the principal factors foster the adoption and usage of ICT in Rwandan commercial banks. Hence, the research is descriptive and correlation research design. Data was collected through a self-constructed and statistically validated questionnaire, thus five commercial banks were used for the research. A sample size of 274 employees of different managerial positions was used for the study. Stratified sampling technique was adopted to sample the employees in each department from the various banks headquarters, and the random sampling technique was used to administer the questionnaires to the respondents. A total of 353 questionnaires were distributed and 274 usable questionnaires were retrieved and utilized for the statistical analysis. The statistical results indicate that cost of adoption, risk of innovation, staff training had perceived and significant influence on ICT adoption and usage among the surveyed commercial banks in Rwanda.

KEYWORDS

ICT, adoption, & banking in Rwanda, cost of adoption, risk of innovation, staff training.

1. INTRODUCTION

The developments in information communication and technology (ICT) are radically changing the platform of business transactions within and outside Africa. These profound developments have opened-up new debates, perspectives and delivery channels for banking products and services. Also, they have created a freedom-enslavement mind-set. The freedom-enslavement mentality is complex and paradoxical. Its complexity emanates from banks' cost-benefit analysis in the adoption of ICT and paradoxical since efficiency-inefficiency doubt is inbuilt. While the control-chaos philosophy has perverted the minds of adopters, the decision to adopt/use is challenging. The technological hardware or facilities are not geographically restricted. Instead, it is the adoption/usage and application of information technology concepts, techniques, and policies to banking services that has become a dividing subject. However, identifying the influence of perceived ease of use and compatibility on adoption/usage in Rwanda context is important to banks and indeed a prerequisite for local and global competitiveness.

Contextually, ICTs and its hype are more than just computers and the internet. ICT encompasses the information that businesses create and use, as well as the wide spectrum of increasingly convergent (Moore, 2004; Brown and Licker, 2007; and Gibbs, Sequeira and White, 2007) and linked technologies that process the information` (Rogers, 2004; Moore, 2004 and Barba, Pilar & Jimenez, 2007). Therefore, ICTs should be viewed as a collective term for a wide range of software, hardware, telecommunications and information management techniques (Davis, 1993; Afuah, 2003 ; and Zappala and Gray, 2006), applications and other devices that are used to create, produce, analyze, process, package, distribute, receive, retrieve, store and transform information (Shavinina, 2003 and Barba, Pilar & Jimenez, 2007). While the understanding appears comprehensive, how the psychology of adopters that categorically shapes the choice of adoption/usage decision is divergent.

Rwandan commercial banks and the management are not humanly different from others, rather the competitive characteristics, total capitalization-related features, network externalities, and decision-making process could distinguish them from others. These identified parameters play macroperspective role in shaping ICTs users' perception on determining and the willingness to adopt/use. Although Rwanda is constrained by divergent factors (Lwakabamba, 2006; Bureau of African Affairs, 2008; and World Bank, 2008; 2009) the use ICT becomes a catalyst for leveraging effect; by providing and improving access to commercial banks basic services. While adoption/usage may conjure interpretative differences, understanding it as a process that is subject to psychological behavior makes this analysis relevant.

The choice of these factors as key determinants of ICT adoption and usage in Rwandan Commercial banks rests on competitive advantage and performance enhancement which are structurally imperative to management decisions, customers' convenience, bank's survival, the employees' self-confidence and the board of directors in decision making. The thrust of the research is to establish the roles of ICTs perceived ease of use and compatibility towards adoption and usage decision in Rwandan commercial banks. The research highlights the principal determinants of ICT adoption and usage and investigated accordingly. The work is divided into sections with the foregoing introduction, followed by the theoretical and related literature review, methodology design, data analysis, interpretation and discussions, and the conclusion respectively.

2. THEORETICAL AND RELATED LITERATURE REVIEW

2.1. COST OF ADOPTION

Use or innovation of a new technology often involves huge upfront costs, for example, investment in production, training of workers, marketing and research development. Hall and Khan (2002), points out that, firms will have an incentive to invest in a new technology only if it can later obtain profits that justify the initial investment.

The use of ICT in organizations as stated by Gerald and Dennis (2006), involves different costs and these costs are both direct and indirect. They further indicate that indirect cost is more significant than direct costs. Organizational cost can arise from the transformation from the old to the new work practices. At first a temporary loss in productivity may be experienced and further additional organizational cost may be experienced once the basic functions of the system are in place. Management time could also be a significant indirect cost because time is spent leading, planning and organizing the integration of new systems into

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current work practices and in addition the result of implementing newly adopted technologies may force management to spend time revising, approving and subsequently amending their ICT strategies.

Perceived cost can also be viewed from two perspectives, cost involved in acquiring the technology and cost savings that will be achieved both by the banks and the customers, through the use of the technology.

2.2. RISK OF INNOVATION

Although electronic banking provides many opportunities for the banks, it is also the case that the banking services provided through internet are limited due to security concerns and technology problems. Kaleem and Ahmad (2007) view risk in the context of security concerns, and trust in one's bank, while Saadullah (2007) indicates that perceived risk is related to reliability and system failure. Lichtenstein and Williamson (2006) indicate that security, privacy, trust and risk concerns may impact consumer internet banking adoption. They further indicate that 80% of global phishing attacks in the first quarter of 2005 targeted the financial services sector.

Continuing technological innovation and competition among existing banking organizations and new market entrants has allowed for a much wider array of electronic banking products and services for retail and wholesale banking customers. These include traditional activities such as accessing financial information, obtaining loans and opening deposit accounts, as well as relatively new products and services such as electronic bill payment services.

Security is defined as a threat which creates "circumstances, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, and modification of data, denial of service and/or fraud, waste and abuse. Craig, Justin, and Eric, (2003) indicates security risk as being one of the major barriers to the adoption of ICT in the banks.

Information communication and technology has created a new realm of opportunities for illegal activity. One can act anonymously or assume false identities; the environment allows deceptive undertakings, such as fraudulent requisitions from electronic stores (e-stores), gathering of sensitive information via unauthorized electronic mail (e-mail) monitoring, the disruption of a web site by sending viruses or the illegitimate acquisition of credit cards numbers. Such illicit actions – and the threat of these – entail increased security costs and consequently higher product prices, and are thus harmful for both organizations operating in electronic commerce and consumers. (Valtonen, Tuomas, Reuna, &Luhtinen 2002).

Toigo, (2003) indicates that strategic risk, operational risk, and reputational risk are some of the risks heightened by the rapid introduction and underlying technological complexity of ICT. Suominen (2001), in his research on the Nordic banks, he notes that there have been some instances where large e-banks have crashed, blocking customers access to their accounts for long periods of time. This has necessitated the banks to invest enormous sums of money to avoid the problem.

Reputation of a service provider is an important factor affecting trust. Kaleem and Ahmad (2008) defines reputation as the extent to which customers believe a supplier or service provider is honest and concerned about its customers. They further content that customers complain about computer logon times which are usually longer than making a telephone call, and also check and recheck the forms filled online, as they are worried about making mistakes. Confidentiality of consumer data and lack of specific laws to govern internet banking is a major concern for both the bankers and the customers. This includes issues such as unfair and deceptive trade practices by the suppliers and unauthorized access by hackers.

In his research, Schaechter (2002) categorized risks that are associated with electronic banking as follows:

- a. Strategic risk. This refers to the current and prospective impact on earnings or capital arising from adverse business decisions, improper implementation of decisions, or lack of responsiveness to industry changes. Management should understand the risk associated with electronic banking before making decisions to use particular electronic banking products. Management need to ensure that the particular electronic banking technology is consistent with the authorized institutions strategic plan and whether there is adequate expertise and resources to identify, monitor and control risk.
- b. **Operational risk.** The central use of new technology to provide e-banking services has important implications on banks operational risk. These risks arise from fraud, processing errors, and system disruptions. E-banking activities increase the complexity of the banks activities and quantity of its transactions especially if the bank offers services that have not been standardized.

Security is considered the central operational risk of e-banking. Threats may come either from inside or out of the system. The threats include unauthorized access to the system through –back doors, sniffing or spoofing to retrieve and use confidential consumer information, add customer assets, and subtracting customer liabilities

c. Reputational risk.

Gefen and Straub (2002), indicate that reputational risk is considerably increased through e-banking. If a bank fails to deliver secure, accurate and timely services on a consistent basis, its reputation is always at risk. In addition to system availability and integrity, breaches in data confidentiality and any other glitches to the security of operations can damage a banks reputation.

Problems encountered in one e-bank can potentially affect other e-banking service providers if customers lose confidence in electronic delivery channels as a whole or view bank failures as being related to supervisory deficiencies in the system.

d. Legal risk.

Banks that adopt and use ICT can potentially expand the geographical scope of their services faster than the traditional banks. These banks may however not be fully prepared and may lack sufficient resources to become entirely familiar with the laws and regulations before beginning to offer services in the new jurisdictions. Schaechter (2002) further indicates that there are two important sources of legal risk. The uncertainty about which legislation to apply to e-banking transactions – the legislation of the jurisdiction in which the bank is licensed or in which the services are offered. Second is the difficulty of enforcing the legislation.

In organizations where managers are the major source of decision making over a new technology, if they recognize that the advantages of IT adoption prevail over the risks, their firm is more inclined to adopt IT (Aziz, Zulkifli, & Ghobakhloo, 2010)

2.3. STAFF TRAINING

Bantel and Jackson (1998) ascertain that attained education level is correlated with cognitive ability. Higher levels of education should be associated with an individual's ability to generate and implement creative solution to complex problems. They further conclude that their ability to generate creative solutions explains why people who are more educated have more receptive attitudes towards innovation, and therefore the association between education and both cognitive abilities and attitudes towards innovative firms are those that have more highly educated top management team.

So as to gain benefits from technologies, there is a need to invest not only on physical technologies but also capacity-building, and skills. Walker, (2005) contend that, ICT training is a primary organizational factor because it helps users to understand how to best use and adopt ICT. He further indicates that lack of training plays a key role as a barrier to the adoption of ICT., Sánchez, Martínez-Ruiz, & Jiménez-Zarco, (2007) outline that one of the main difficulties for exploiting ICTs potentials is the lack of awareness of the benefits to be derived coupled with little or no specific training on ICTs (both at application and methodological levels).

Human skills may be developed by investment in education in schools and universities, emphasizing computer literacy and informatics in engineering, business and technical schools (Young, 2007). Chun, (2003) indicates that highly educated workers are more likely to implement new technologies such as information technology. The result of Fishbein and Ajezen (2005), research on ICT adoption in Malaysian SMEs, indicate that 130 out of 180 companies never develop formal ICT training for their employees; thus, resulting to lack of trained personnel in ICT, which further hinders the adoption of ICT.

The adoption of continuous training solutions can play an important role in increasing the awareness of the huge potentialities of ICTs for concrete situations; in these way employees and managers can acquire a learning culture, integrating the training in their work activities and understanding in depth the potentialities of communication and information tools (Chun 2003).

3. RESEARCH METHODOLOGY

The theoretical architecture was bridged with methodological design towards deepening the scientific or philosophical undertone of the research. The research employed and utilized descriptive and correctional research design. The choice of these designs was informed by the ability of descriptive method to profile

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respondents categorically (Greener, 2008) and the correlation was to examine the relationship between variables (Wallace and Wray, 2006). Collectively, these designs formed the background upon which the statistical analysis is based. Evidence from Adams, Khan, Raeside and White (2007), Remenyi (2002 & 2005), and Pallant (2005) have demonstrated that survey-based research which required grouping is best organized and analyzed with descriptive approach.

Primary data was used for the research. This was collected through a self-constructed questionnaire. The questionnaire was constructed on a likert-scale. The face, content, and construct validity (Greener, 2008) were established through experts' intervention from the field of management. The statistical reliability with Cronbach's alpha for perceived ease of use is 0.64 (64%) and ICT compatibility 0.63 (63%) respectively which Strauss and Corbin (1998), Oppenheim (1992), Diaz de Rada (2005), and Bryman and Bell (2003) have demonstrated to be of acceptable standard. The questionnaire was administered to 353 employees in the chosen five commercial banks' headquarters in Kigali using a stratified random sampling technique. Of the three hundred and fifty three (353) questionnaires distributed, 274 were retrieved and considered usable for the research. The respondents' participation was solicited through a consent letter and the data gather are for academic purpose only.

DATA ANALYSIS, INTERPRETATIONS AND DISCUSSIONS 4.

4.1. PROFILE OF THE RESPONDENTS

The profile of the respondents was analyzed through descriptive statistics as presented in Table 1.1 and it indicates that a total of 200 male group representing (73%) and 74 female, representing (27%) of the total 274 respondents used in the study. This proportional difference only reflects the number of respondents surveyed. However, the research of Castel, Salvador, and Sanz (2010) indicates that the male gender tends to adopt new technologies faster that the female counterpart both at home and at work place. Also, Esteves, Bohorquez, & Souza, (2008) in their paper indicate that female have more negative attitudes towards computers and internet than men. It is not this paper submission that gender impact adoption rather a categorization of the respondents.

Demographic Variables	Categories	Frequency	Percentage
Gender	Male	200	73%
	Female	74	27%
Educational Level	Diploma / Certificate	87	31.8%
	Bachelors	178	65.0%
	Masters	3	1.1%
	PhD	0	0%
	Others	2	0.7%
Terms of Employment	Permanent	241	88.0
	Temporary	17	6.2
	Part Time	9	3.3
Work Experience	Less than 1Year	96	35.0
	1 to 3 Years	124	45.3
	4 to 6 Years	40	14.6
	7 to 10 Years	11	4.0
	Above 10 Years	3	1.1

TABLE 1 1- DISTRIBUTION OF THE RESPONDENTS BY DEMOGRAPHIC FACTORS

Table 1.1 further indicates that out of the 274 respondents, 87 represented (31.8%) has a certificate or Diploma, 178 respondents (65%) has Bachelors Degree, 3 respondents (1.1%) with Masters Degree, PhD has 0 (0%) respondents, and 2 respondents hold other academic qualifications represented by 0.7% of the total respondents. However, four of the respondents representing 1.5% did not indicate their academic qualifications. Table 1.1 also indicates the term of employment. Of the total 274 respondents, 241 (88%) are permanently employed, 17 respondents (6.2%) are temporary employed, 9 respondents (3.3%) are part time workers and 7 respondents (2.6%) did not indicate their employment category. From the statistical results, permanent employees had the highest percentage, followed by temporary and part-time respectively. Further, this indicates that 96 respondents (35%) have worked with the banks for less than one year, 124 respondents (45.3%) have worked with the bank between one and three years, 40 respondents (14.6%) have worked with the bank between 4 and 6 years, 11 respondents (4%) have worked with the bank between 7 and 10 years, and 3 respondents (1.1%) have worked for more than 10 years.

4.4.1. Staff training

The table below gives a summary of the response given by the bank employees. It gives a summary as to whether training determines the adoption of ICT in the bank.

SUMMARY OF THE RESPONDENTS RESPONSES ON STAFF TRAINING

Questions	N	Minimum	Maximum	Mean	Std. Deviation
I attend training on the new technology before accepting to use it	274	1.00	4.00	3.40	1.051
Without training on the new technology I may find it hard to use it.	274	1.00	4.00	3.47	1.028
If trained on a new technology no matter how complex it is I will not have a problem using it	267	1.00	4.00	3.45	.922
Overall Mean for staff Training	267	1.00	4.00	3.4422	.61424

Source: Authors Compilation (2010)

The table above reveals all the three variables had a mean greater than 3.00, but less than 3.50. The variable which was ranked the highest with the highest mean (3.47), verbally interpreted as tend to agree, indicated that the respondents may find it hard to use the new technology if they are not trained on how to use it. The second variable had a mean of 3.45, verbally interpreted as tend to agree, indicated that if the respondents are trained on the new technology, it does not matter if its hard or complex they will not have a problem using it. The third variable had a mean of 3.29, verbally interpreted as tend to agree, the respondents agree that they will only use the new technology if they are trained on how to use it.

The overall mean for staff training was 3.4422, which indicates that there exists a significant relationship between the adoption of ICT in the surveyed banks and staff training. This implies that training of staff largely influence the adoption of ICT in the surveyed banks. As stated by (Alam & Mohammad, 2009), lack of suitable technical and managerial staff with sufficient ICT expertise is a major barrier for adopting of ICT. They further agree that a skilled and knowlegeable work force is closely linked with the successful implementation of the technology. Sánchez, Martínez-Ruiz, & Jiménez-Zarco, (2007) in their research, they conclude that the adoption of continuous training solutions can play an important role in increasing the awareness of the huge potentialities of ICTs for concrete situations; in this way employees, managers, and entrepreneurs can acquire a learning culture, integrating the training in their work activities and understanding in depth the potentialities of communication and information tools. Amin, (2007) contends that banks must support the use of the system by providing in-group training in order to make them aware and believe about the usefulness of the system.

4.4.2. Cost of Adoption

Table 4.4.2 gives a summary of the response given by the bank employees. It gives a summary as to whether the cost of adopting the new technology plays a role in determining the adoption of ICT in the bank.

TABLE 4.4.2: SUMMARY OF THE RESPONDENTS RESPONSES ON THE COST OF ADOPTION					
Questions	N	Minimum	Maximum	Mean	Std. Deviation
The organization does not encourage buying of new technologies if they seem expensive	259	1.00	4.00	2.53	.978
The organization will always look for the cheapest technology in the market when need arises to buy	259	1.00	4.00	2.59	1.259
The organization waits until the price of the required technology goes down before they purchase it	259	1.00	4.00	2.64	1.235
The organization does a lot of tendering so as to get the cheapest before they buy the technology	274	1.00	4.00	2.46	1.034
Overall Mean for Cost of Technology	247	1.00	4.00	2.5450	.91811

Table 4.4.2 above reveals that all the means for the cost of adoption are less than 3.00. The variable that scored the highest mean (2.64), verbally interpreted as tend to disagree. It indicates that the respondents do not agree that the organization waits until the price of the required technology goes down before they purchase it. The second variable has a mean of 2.59, verbally interpreted as tend to disagree. It means the respondents do not agree that the organization always looks for the cheapest technology in the market when they need to buy one. The third mean of 2.53 verbally interpreted as tend to agree. It means that the respondents do not agree that the organization encourages the buying of the new technologies if they seem expensive. The lowest mean was 2.46, verbally interpreted as tend to disagree. It means that the respondents do not agree that the organization encourages the buying of the new technologies if they seem expensive. The lowest mean was 2.46, verbally interpreted as tend to disagree. It means that the respondents do not agree that the organization waits until the price of the technology they want to acquire goes down before they buy it. The overall mean for the cost of adoption is 2.545, verbally interpreted as tend to disagree. This means that the employees do not agree that cost of adoption is a determinant in adopting the required technology.

4.4.3. Perceived Risk of Innovation

Table 4.4.4 below gives a summary of the response given by the bank employees. It gives a summary as to whether perceived risk of innovation is a determinant in the adoption of ICT in the bank.

Questions		Minimum	Maximum	Mean	Std. Deviation
I am always cautious if the new innovation will actually work	271	1.00	4.00	3.45	1.006
I don't use the new technology if I perceived it to have or produce any errors	274	1.00	4.00	3.41	1.045
I always inquire if the new technology works well before I use it	274	1.00	4.00	3.41	1.045
The new technology must be tested first if I have to agree to use it	274	1.00	4.00	3.37	1.073
Perceived Risk	274	1.00	4.00	3.4060	.53071

Source: Authors Compilation (2010)

Table 4.4.4 above gives a summary of the respondent's responses on how they perceive the risk of innovation. All the questions scored a mean between 3.00 and 3.50, verbally interpreted as tend to agree. The respondents tend to agree that they always inquire if the new technology works well before they agree to use it. They tend to agree that they are always cautious if the new innovation will actually work, that they don't use the new technology if they perceive it to have or produce any errors and the new technology must be tested first before they agree to use it. The overall mean for the perceived risk of innovation was 3.4060 verbally interpreted as tend to agree.

	Cost of Adoption	
ICT Adoption	Pearson Correlation	.417**
	Sig. (2-tailed)	.000
	N	272

From table 4.46, statistical evidence depicts a significance relationship between the cost of adoption and the adoption of ICT, in the surveyed banks. The Pearson relationship between ICT adoption and the perceived risk of innovation exhibits positivity (0.417), implying that, as the cost of new technology increases the respective surveyed banks will continue to adopt the new technologies.

This implies that cost is not an impediment to the adoption of the new technologies. If the cost of the new technologies increases the surveyed banks will continue to adopt them, majorly because they need to leapfroging the business organization from the present operational constraints to future organizational excellence, in providing better services to its customers. Adopting of ICT brings enormous benefits, advanced communication technologies such as email help firms communicate faster and cheaper with both its suppliers and clients.

		Perceived Risk
ICT Adoption	Pearson Correlation	292**
	Sig. (2-tailed) N	.000 272

From table 4.48, statistical evidence depicts a significant relationship between perceived risk of innovation and the adoption of ICT, in the surveyed banks. The Pearson relationship between ICT adoption and the perceived risk of innovation exhibits positivity (292), implying that, as the respondents perceive an innovation as not having risks, they will adopt the technology in question. Thus if there is an increase in the employees perception that the technology to be adopted has no risk, then the level of adoption of that particular technology will increase. It can then be concluded that perceived risk of innovation is a factor that determines the adoption of ICT, in the respondent banks.

Bakkabulindi, Nkata and Amin (2006), notes that, if the employees perceive the new technology to be having risks, they revert to the traditional system. The employees may perceive risk to be monetary or privacy. If the employees perceive risk as being monetary, they will have the fear of transactions errors, which they presume may result to monetary loss to be suffered by both the bank and the customers. The privacy risk is seen as potential loss due to fraud or hackers compromising the security of the online system, thus collecting personal information such as usernames, passwords and credit card details, thus violating the user's privacy.

			Staff Training		
	ICT Adoption	Pearson Correlation	.237**		
		Sig. (2-tailed)	.000		
		Ν	272		

From table 4.45, statistical evidence depicts significant relationship, between the adoption of ICT and staff training in the surveyed banks. The Pearson correlation between ICT adoption and staff Training exhibits positivity (.237), implying that if the employees are trained on the new ICT technologies in the market they become more willing, eager and open to adopt the new ICT technologies in the market. This is ascertained by Walker (2005), who contends that ICT training is a primary organizational factor because it helps users to understand how to best adopt and use ICT. He further emphasizes that lack of training plays a key role as a barrier to the adoption of ICT. The same is echoed by Olshavsky and Spreng (1996), in their results from a research on ICT adoption in Malaysian SME's, where they indicate that 130 out of 180 companies that never developed formal ICT training for their employees, resulted to lack of trained personnel in ICT, which further hindered the adoption of ICT, in the organizations. Polatoglu (2001) further indicates that, firm- level evidence suggest that

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effective diffusion and use of ICT are key factors in broad-based groweth when combined with effective human resource strategires involving education and trainning.

Ward (2005) in their research, they came to the conclusion that, ICT adoption requires training for the proper use of the technology. The education and training can either be simple or fairly detailed. They further identified staff training on ICT, as one of the factors that influence the use of internet in the United States. They drew to the conclusion that ICT adoption is expected to increase with better education and staff training on the various ICT technologies.

In his research on the survey of ICT adoption and diffusionin Makerere university Bakkabulindi, Nkata and Amin (2005) noted that the majority of participants admitted that if they have more knowledge about ICT they feel more confidnet in using and also they are more satisfied with the ICT usage because they can obtain more benefits from it. Also as their knowledge improves they are more willing to use it and apply it in their jobs and even in there daily life.

Based on the findings, it's there for imperative that for the banks to have high adoption rates of any new ICT technologies, the banks need to put in place policies that encourage and foster employee training on the new ICT technologies.

5. CONCLUSION

Based on the findings, of this research, it can be concluded that: staff training, cost of adoption, and perceived risk of innovation influence the adoption of ICT, in the Rwandan commercial banks.

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