Impact of Information and Communications Technology Parameters on Performance of Nepalese Commercial Banks

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Abstract

This study examines the impact of information and communications technology parameters on the performance of Nepalese commercial banks. Bank performance is selected as the dependent variable. The selected independent variables are mobile banking, internet banking, POS banking, QR code banking, SMS alert system, ATM banking and internet security features. The primary source of data is used to assess the opinions of the respondents regarding information and communications technology parameters, its usage, and its impact on the performance of Nepalese commercial banks. The study is based on primary data with 120 respondents. To achieve the purpose of the study, structured questionnaire is prepared. The correlation coefficients and regression models are estimated to test the significance and importance of information and communications technology parameters on the performance of Nepalese commercial banks.

The study showed that internet security features have positive impact on the performance of banks. It indicates that stronger internet security leads to increase in performance of banks. Similarly, mobile banking has a positive impact on the performance of the banks. It indicates that increase in the usage and availability of mobile banking services leads to increase in the level of bank performance. Moreover, POS banking has a positive relationship with the performance of the banks. It indicates that the utilization of POS banking services leads to increase in the level of bank performance. Furthermore, internet banking has a positive impact on performance of banks. It indicates that increase in the usage and adoption of internet banking services leads to increase in the level of bank performance. Likewise, QR code banking (QR) has a positive impact on the performance of the banks. It indicates that the better implementation of QR code banking services leads to increase in the level of bank performance. Similarly, SMS alert system has a positive impact on the performance of the banks. It indicates that the better implementation of SMS alert systems leads to increase in the level of bank performance. Further, ATM service has a positive impact on the performance of the banks. It indicates that increase in the usage and availability of ATM services leads to increase in the level of bank performance.

Keywords: mobile banking, internet banking, POS banking, QR code banking, SMS alert system, ATM banking, internet security features, bank performance.

1. Introduction

Internet technology holds the potential to fundamentally change banks and the banking industry. The development and the increasing progress that is being experienced in the Information and Communication Technology have

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brought about a lot of changes in almost all facets of life. In the Banking Industry, it has been in the form of online banking, which is now replacing the traditional banking practice. Online banking has a lot of benefits which add value to customers' satisfaction in terms of better quality of service offerings and at the same time enable the banks gain more competitive advantage over other competitors (Barroso and Laborda, 2022). The widespread availability of internet banking is expected to affect the mixture of financial services produced by banks, the manner in which banks produce these services and the resulting financial performances of these banks. Banking through internet has emerged as a strategic resource for achieving higher efficiency, control of operations and reduction of cost by replacing paper based and labor-intensive methods with automated processes thus leading to higher productivity and profitability. Banks boost technology investment spending strongly to address revenue, cost and competitiveness concerns (Chavan, 2013). Information and communications technology (ICT) encompasses a wide range of technological tools and resources utilized for the transmission, storage, creation, sharing, and exchange of information. Information systems (IS) utilize various information technologies (IT), such as computers, software, databases, communication systems, internet, mobile devices, and more, to perform specific tasks and engage with different individuals or groups within organizational or social contexts. The use of information and communication technology to gain competitive advantage has become a key strategic issue amongst organizations in the fast-globalizing environment as ICT plays a strategic role in the management of organizations (Apulu and Latham, 2011). The use of information and communications technology parameters in the banking sector has led to enhancement in their performance and improvements in risk management. According to Khanboubi *et al.* (2019), information technology solutions have helped banks to manage risks more effectively by providing real-time data analysis and risk monitoring capabilities. This has allowed banks to identify and mitigate risks more quickly, which has helped to reduce the likelihood of losses due to fraud or other risks. The advent of information technology has revolutionized the banking sector worldwide. According to Alzoubi and Al-Zoubi (2019), the integration of computer systems and communication technology has provided new opportunities for global economic activity. The adoption of technology in the banking sector has resulted in improved accessibility for customers, increased efficiency in banking operations, and lowered costs for financial service providers.

The introduction of information technology parameters such as SMS banking, internet banking, ATMs, mobile banking, POS banking, QR

codes, SMS alert systems, and internet security features has the potential to revolutionize the banking sector by offering innovative and efficient ways of banking services to customers. Al-Tamimi and Mazrooei (2007) found that the adoption of IT in the UAE banking sector has a positive impact on profitability, efficiency, and customer satisfaction. Similarly, Adnan *et al.* (2019) found that IT has a positive impact on bank performance in Pakistan. Siam (2006) investigated the impact of electronic banking services on the profits of Jordanian banks. The study found that although electronic banking services initially incurred costs and investments in technical infrastructure and employee training, they have a positive impact on banks' profitability in the long run. Malhotra and Singh (2009) investigated the impact of internet banking on bank performance and risk in India. The result showed that banks with proper internet and modern technology have better operating efficiency ratios and profitability as compared to non-internet banks. Hernando and Nieto (2005) examined the performance of multichannel banks in Spain between 1994 and 2002. The adoption of the Internet as a delivery channel had a positive impact on banks' profitability after one and a half years of adoption. Sathye (2005) investigated the impact of the introduction of transactional Internet banking on performance and risk profile of major credit unions in Australia. The study showed that the internet banking variable didn't show a significant association with the performance as well as with operating risk variable. Thus, Internet banking didn't prove to be a performance enhancing tool in the context of major credit unions in Australia. DeYoung *et al.* (2006) observed the change in financial performance of Internet community banks in U.S. during 1999-2001. The results found that Internet adoption improved community banks' profitability, particularly through increased revenues from deposit service charges. Internet adoption was also associated with movements of deposits from checking accounts to money market deposit accounts, increased use of brokered deposits and higher average wage rates for bank employees.

Gupta *et al.* (2011) investigated the impact of SMS banking in India. The study found that SMS banking has a positive impact on customer satisfaction and loyalty towards their banks. Hirtle and Stiroh (2007) found that banks with higher levels of internet banking adoption had higher levels of profitability and productivity in the context of USA. The use of ATMs has a positive impact on banks' profitability and customer satisfaction. Dawes and Moyes (2002) found that ATMs have significantly increased banks' cost efficiency and improved customer convenience in the context of UK. Mobile banking has been found to be a convenient and efficient way for customers

to perform transactions. Huang *et al.* (2015) found that mobile banking has a positive impact on customer satisfaction and loyalty towards their banks in China. POS banking is a popular and convenient way for customers to pay for goods and services. Akin and Yildiz (2012) found that the adoption of POS terminals has a positive impact on banks' profitability and customer satisfaction in Turkey. In addition, QR codes have been found to be a convenient and efficient way for customers to make payments. Wu and Li (2019) found that the adoption of QR codes has a positive impact on customer satisfaction and loyalty towards their banks in China. SMS alert systems is an effective way for banks to communicate with their customers and provide them with important information. Zainuddin *et al.* (2015) found that SMS alert systems had a positive impact on customer satisfaction and loyalty towards their banks in Malaysia.

In the context of Nepal, Sapkota *et al.* (2018) explored the prevailing status of the use of ICT in commercial banking services. The study found that the banking sector using information technology has increased. The study also showed that the operational efficiency of those banks using latest technology has increased massively. Bhattarai (2014) examined the impact of electronic banking in Nepal. The study found that the adoption of electronic banking has a positive impact on the performance of Nepalese banking sector. According to Thapa and Pandey (2019), electronic banking has increased the efficiency of banking operations, reduced errors, and improved customer satisfaction. Additionally, electronic banking has expanded access to financial services for underserved populations, which has promoted inclusive economic growth. In addition, IT has enabled banks to offer new services such as internet banking, mobile banking, and SMS banking, which has led to increased customer satisfaction.

The above discussion shows that empirical evidences vary greatly across the studies concerning the impact of information and communications technology parameters on bank performance. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exist in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The main purpose of the study is to analyze the impact of information and communications technology parameters on the performance of Nepalese commercial banks. Specifically, it examines the impact of mobile banking, internet banking, POS banking, QR code banking, SMS alert system, ATM banking and internet security features on the performance of Nepalese

commercial banks.

The remainder of this study is organized as follows. Section two describes the sample, data and methodology. Section three presents the empirical results and the final section draws the conclusion.

2. Methodological aspects

The study is based on the primary data. The data were gathered from 120 respondents through questionnaire. The study used convenience sampling technique to select the sample for the study. The respondents' views were collected on of mobile banking, internet banking, POS banking, QR code banking, SMS alert system, ATM banking and internet security features and level of performance of Nepalese commercial banks. The study is based on descriptive and causal comparative research designs.

The model

The model estimated in this study assumes that performance of Nepalese commercial banks depends on availability of mobile banking, internet banking, POS banking, QR code banking, SMS alert system, ATM banking and internet security features. Therefore, the model takes the following form:

$$PNCB = \beta_0 + \beta_1 IS + \beta_2 MB + \beta_3 POS + \beta_4 IB + \beta_5 QR + \beta_6 SMS + \beta_7 ATM + e$$

Where,

PNCB = Bank performance

MB = Mobile banking

IB = Internet banking

ATM = ATM services

POS = POS banking

QR = QR code banking

SMS = SMS alert system

IS = Internet security features

Internet security features was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "I feel more secure using my bank's services since the implementation of internet security features", "Implementation of internet security features has increased my trust in my bank and encouraged me to perform more transections" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.720$).

Mobile banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree

and 5 for strongly agree. There are 5 items and sample items include "Using mobile banking has improved my overall banking experience with the bank", "Mobile banking has made banking transactions more convenient for me" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.727$).

POS banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "Using POS banking has improved my overall banking experience with the bank", "POS banking has made banking transactions more convenient for me" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.709$).

Internet banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "Using Internet banking has improved my overall banking experience with the bank", "Internet banking has made banking transactions more convenient for me" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.757$).

QR code banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "Using QR code banking has improved my overall banking experience with the bank", "QR code banking has made banking transactions more convenient for me" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.730$).

SMS alert system was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "Using SMS alert system has improved my overall banking experience with the bank", "SMS alert system has made banking transactions more convenient for me" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.727$).

ATM services was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "Using ATM services have improved my overall banking experience with the bank", "ATM services have made banking transactions more convenient for me" and so on. The reliability of the items was measured by computing the Cronbach's

alpha ($\alpha = 0.760$).

Bank performance was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly disagree and 5 for strongly agree. There are 5 items and sample items include "I am satisfied with the efficiency of my bank's transaction processing and service delivery", "The overall performance of my bank in terms of service quality is satisfactory" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.810$).

The following section describes the independent variables used in this study along with the hypothesis formulation.

Internet security features

Malhotra and Singh (2009) investigated the effect of internet banking security measures on the performance of commercial banks in India. The study found that the implementation of security measures such as firewalls, antivirus software, and intrusion detection systems have a positive impact on bank performance, including customer satisfaction, trust, and loyalty. Wang and Chen (2018) found that the implementation of security measures such as two-factor authentication and strong passwords have a positive impact on customer satisfaction and trust in internet banking. Likewise, Liu *et al.* (2019) found that the implementation of security measures such as data encryption and secure sockets layer (SSL) have a positive impact on the security of internet banking transactions which leads to better performance. Moreover, Zhang *et al.* (2020) found that the implementation of security measures such as regular security audits and employee training have a positive impact on the prevention of internet banking fraud. Based on it, this study develops the following hypothesis:

H_1: There is a positive relationship between internet security features and bank performance.

Mobile banking

Zu *et al.* (2019) examined the impacts of financial innovation on banks profitability performance by means of electronic banking services in Africa from the period of 2015-2018. The study revealed that there is a strong relationship between banks profitability, POS terminal, mobile banking and internet banking. The technology-based products such as mobile banking and ATM service provide opportunities for financial institutions to have important cost advantages, ease nether risk and increasing profitability than the traditional way of banking (Okiro and Ndungu, 2013). Similarly, Adewumi *et al.* (2019) found that mobile banking had a positive impact

on the financial performance of commercial banks in Nigeria. The study revealed that mobile banking increased revenue, reduced costs, and improved profitability. Furthermore, Mohammed (2020) found that mobile banking had a positive impact on the operational efficiency of commercial banks in Kenya. The study revealed that mobile banking reduced the number of employees, the number of branches, and the cost of operations. Based on it, this study develops the following hypothesis:

H_2: There is a positive relationship between mobile banking services and bank performance.

POS banking

Smith *et al.* (2021) examined the impact of point-of-sale (POS) banking on the performance of commercial banks in the United States. The study found that the adoption of POS banking technology has a significant positive effect on the performance of commercial banks. Chen and Liu (2019) explored the effects of POS banking on the performance of commercial banks in China. The study indicated that the integration of POS banking technology resulted in several benefits for banks. Firstly, it enhanced customer experience by providing a seamless and efficient payment method. This improvement in convenience and speed led to heightened customer satisfaction levels. Secondly, POS banking has a positive impact on the profitability of commercial banks. By reducing operational costs, such as those associated with manual cash handling and transaction processing, banks were able to allocate resources more effectively, leading to increased profitability. Sharma and Agarwal (2020) shed light on the transformative effects of POS banking on performance of bank. The study revealed that the adoption of POS banking has a significant positive effect on the overall performance of commercial banks through the improvement in operational efficiency. Based on it, this study develops the following hypothesis:

H_3: There is a positive relationship between POS banking services and bank performance.

Internet banking

Akhisar *et al.* (2015) assessed the effects of innovations on bank performance in the context of electronic banking services. The study found that the adoption of internet banking services by customers has a positive effect on the bank performance. Similarly, Dinh *et al.* (2015) found that there is a positive impact of internet banking on bank performance in the context of Vietnam. Sirengo (2017) analyzed the effect of electronic banking on performance of commercial banks in Kenya and found that internet banking

can be a valuable tool for commercial banks. It can help banks to improve customer satisfaction, reduce costs, and improve efficiency. Callaway (2011) revealed that there is a positive association between internet banking and level of performance. Based on it, this study develops the following hypothesis:

H_4: There is a positive relationship between internet banking and bank performance.

QR code banking

Migliore *et al.* (2022) assessed the effect of adoption of QR code technology by banks on their performance. The study found that the adoption of QR code payment by commercial banks positively affect their profitability and operational efficiency as QR codes could help commercial banks to reduce transaction costs and improve customer satisfaction. Similarly, Li and Xu (2013) examined the impact of QR code adoption on the financial performance of commercial banks in China. The study found that the use of QR codes significantly improved the banks' profitability. Furthermore, QR code adoption could enhance customer loyalty and increase market share for commercial banks. Trigo *et al.* (2021) examined the challenges and opportunities of QR code adoption by commercial banks. The study found that QR code banking has several opportunities, such as convenience, cost-effectiveness, and security, but it also has some challenges, such as lack of standardization, compatibility issues, and security concerns. Based on it, this study develops the following hypothesis:

H_5: There is a positive relationship between QR code banking and bank performance.

SMS alert system

Implementing an SMS alert system can have significant benefits for both the bank and its customers, leading to improved efficiency, customer satisfaction, and overall financial performance (Mbah and Obiezekwem, 2019). An SMS alert system allows banks to proactively communicate with their customers in real-time. Sending personalized alerts about account activity, transaction updates, balance notifications, and payment reminders keeps customers informed and engaged with their finances. Increased customer engagement often leads to higher customer loyalty and retention, positively impacting the bank's performance (Omar *et al.*, 2011). SMS alerts can help customers quickly identify and report any suspicious transactions or unauthorized access to their accounts. Timely notifications enable customers to take immediate action, reducing the potential losses from fraudulent activities. This, in turn, strengthens the bank's reputation for security and

reliability, attracting more customers and potentially increasing deposits and investments (Omomule *et al.*, 2020). By being aware of their financial situation in real-time, customers can make informed decisions about their spending and budgeting. This improved financial management can lead to reduced instances of overdrafts and late payments, which can positively impact the bank's overall financial health (Nwakoby *et al.*, 2020). Based on it, this study develops the following hypothesis:

H_6: There is a positive relationship between SMS alert system and bank performance.

ATM services

ATM banking services offer numerous advantages to both banks and their customers, contributing to improved efficiency, customer satisfaction, and overall financial performance (Chipeta and Muthinja, 2018). ATM banking services provide customers with 24/7 access to their accounts, allowing them to perform various transactions like withdrawals, deposits, balance inquiries, and fund transfers at their convenience. This accessibility enhances customer satisfaction, as they can access their funds and conduct basic banking tasks without the need to visit a physical branch. Satisfied customers are more likely to remain loyal to the bank and may even recommend the bank to others, thereby positively impacting the bank's performance (Gichungu and Oloko, 2015). ATM banking services help reduce operational costs for banks. By encouraging customers to use ATMs for basic transactions, the need for staffing physical branches is reduced, leading to lower overhead expenses. This cost efficiency can improve the bank's overall financial performance and profitability (Aduda and Kingoo, 2012). Providing robust ATM services can help retain existing customers and attract new ones. Satisfied customers are more likely to consolidate their banking needs with the same institution and may also avail other products and services offered by the bank, such as loans and credit cards (Kamau and Oluoch, 2016). Based on it, this study develops the following hypothesis:

H_7: There is a positive relationship between ATM banking service and bank performance.

3. Results and discussion

Correlation analysis

On analysis of data, correlation analysis has been undertaken first and for this purpose, Kendall's Tau correlation coefficients along with means and standard deviations have been computed and the results are presented in Table 1.

Table 1

Kendall's Tau correlation coefficients matrix

This table presents Kendall's Tau correlation coefficients between dependent and independent variables. The correlation coefficients are based on 120 observations. The dependent variable is PNCB (Bank performance). The independent variables are IB (Internet banking), ATM (ATM services), MB (Mobile banking), POS (POS banking), QR (QR code banking), SMS (SMS alert system), and IS (Internet security features).

Variables	IS	MB	POS	IB	QR	SMS	ATM	PNCB
IS	1							
MB	0.472**	1						
POS	0.346**	0.251**	1					
IB	0.527**	0.429**	0.507**	1				
QR	0.499**	0.511**	0.333**	0.457**	1			
SMS	0.322*	0.304**	0.452**	0.383**	0.423**	1		
ATM	0.343**	0.398**	0.361**	0.379**	0.499**	0.455**	1	
PNCB	0.284**	0.658**	0.216**	0.223**	0.287**	0.216**	0.200**	1

Notes: The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.

Table 1 shows that internet security features have positive relationship with the performance of banks. It indicates that stronger internet security leads to increase in performance of banks. Similarly, mobile banking is positively correlated to the performance of the banks. It indicates that increase in the usage and availability of mobile banking services leads to increase in the level of bank performance. Moreover, POS banking has a positive relationship with the performance of the banks. It indicates that the utilization of POS banking services leads to increase in the level of bank performance. Furthermore, internet banking has a positive relationship with performance of banks. It indicates that increase in the usage and adoption of internet banking services leads to increase in the level of bank performance. Likewise, QR code banking (QR) is positively correlated to the performance of the banks. It indicates that the better implementation of QR code banking services leads to increase in the level of bank performance. Similarly, SMS alert system has a positive relationship with the performance of the banks. It indicates that the better implementation of SMS alert systems leads to increase in the level of bank performance. Further, ATM service has a positive relationship with the performance of the banks. it indicates that increase in the usage and availability of ATM services leads to increase in the level of bank performance.

Regression analysis

Having analyzed the Kendall's Tau correlation coefficients matrix, the regression analysis has been carried out and the results are presented in Table 1. More specifically, it presents the regression results of mobile banking,

internet banking, POS banking, QR code banking, SMS alert system, ATM banking and internet security features on the performance of Nepalese commercial banks.

Table 2

Estimated regression results of Internet security features, mobile banking, POS banking, internet banking, QR code banking, SMS alert system and ATM services on performance of Nepalese commercial banks

The results are based on 120 observations using linear regression model. The model is PNCB = $\beta_0+\beta_1$ IS + $\boldsymbol{\beta}_2$ MB + $\boldsymbol{\beta}_3$ POS + $\boldsymbol{\beta}_4$ IB + $\boldsymbol{\beta}_5$ QR + $\boldsymbol{\beta}_6$ SMS + $\boldsymbol{\beta}_7$ ATM + e, where the dependent variable is PNCB (Bank performance). The independent variables are IB (Internet banking), ATM (ATM services), MB (Mobile banking), POS (POS banking), QR (QR code banking), SMS (SMS alert system), and IS (Internet security features).

Model	Intercept	Regression coefficients of							Adj. R_bar^2	SEE	F-value
		IS	MB	POS	IB	QR	SMS	ATM			
1	16.757 (12.097)**	0.266 (3.882)**							0.106	1.710	15.069
2	12.774 (11.993)**		0.435 (8.820)**						0.397	1.414	77.796
3	20.715 (25.534)**			0.076 (1.744)					0.017	1.794	3.040
4	20.430 (23.949)**				0.085 (1.995)*				0.024	1.780	3.979
5	19.123 (21.111)**					0.144 (3.338)**			0.079	1.745	11.139
6	20.995 (23.838)**						0.056 (1.277)		0.005	1.804	1.632
7	20.463 (24.813)**							0.081 (2.025)*	0.025	1.781	4.100
8	13.293 (10.799)**	0.060 (0.838)	0.467 (7.496)**						0.391	1.417	39.152
9	13.337 (10.754)**	0.047 (0.615)	0.470 (7.489)**	0.020 (0.510)					0.387	1.425	26.023
10	13.335 (10.709)**	0.041 (0.523)	0.470 (7.463)**	0.013 (0.280)	0.012 (0.249)				0.382	1.427	19.375
11	13.292 (10.651)**	0.034 (0.412)	0.491 (7.222)**	0.005 (0.104)	0.007 (0.141)	0.039 (0.822)			0.380	1.424	15.591
12	13.487 (10.782)**	0.031 (0.387)	0.483 (7.116)**	0.015 (0.299)	0.004 (0.075)	0.001 (0.016)	0.073 (1.389)		0.385	1.420	13.420
13	13.158 (10.758)**	0.034 (0.424)	0.486 (7.109)**	0.019 (0.373)	0.006 (0.118)	0.010 (0.173)	0.067 (1.244)	0.024 (0.497)	0.381	1.424	11.462

Notes:

i. Figures in parenthesis are t-values.

ii. The asterisk signs (**) and (*) indicate that the results are significant at one percent and five percent level respectively.

iii. Bank performance is the dependent variable.

Table 2 shows that the beta coefficients for internet security features are positive with performance of the banks. It indicates that there is a positive impact of internet security features on performance of the banks. This finding is consistent with the findings of Liu *et al.* (2019). Similarly, the beta coefficients

for mobile banking are positive with performance of the banks. It indicates that mobile banking has a positive impact on the performance of the banks. This finding is similar to the findings of Adewumi *et al.* (2019). Likewise, the beta coefficients for POS banking are positive with performance of the banks. It indicates that POS banking system has a positive impact on performance of the banks. This finding is consistent with the findings of Sharma and Agarwal (2020). Moreover, the beta coefficients for internet banking are positive with performance of the banks. It indicates that internet banking has a positive impact on the performance of the banks. This finding is similar to the findings of Dinh *et al.* (2015). Similarly, the beta coefficients for ATM services are positive with performance of the banks. It indicates that ATM services have a positive impact on the performance of the banks. This finding is consistent with the findings of Aduda and Kingoo (2012).

4. Summary and conclusions

Commercial banks are constantly trying to find the best ways to improve their performance and productivity with the use of information and communications technology parameters. Customers are becoming more demanding, and they have started to pay more attention to the use of Information and communications technology. Information and communications technology help to complete the task in a short period of time with greater security and higher convenience. It involves establishing a link between the commercial banks and their customers. Various ICT parameters such as mobile banking, internet banking, POS, banking, QR code banking, SMS alert system, ATM banking and internet security features have been crucial factors for enhancing the performance of commercial banks.

This study attempts to analyze the impact of information and communications technology parameters on the performance of Nepalese commercial banks. The study is based on primary data with 120 observations.

The study showed that introduction of ICT parameters such as mobile banking, internet banking, POS, banking, QR code banking, SMS alert system, ATM banking and internet security features by the commercial banks as new services to their customers have positive impact on their performance. The study concluded that increase in services such as mobile banking, internet banking, POS, banking, QR code banking, SMS alert system, ATM banking and internet security features leads to increase in the performance level of commercial banks. The study also concluded that mobile banking is the most influencing factor that explains the changes in the performance in context of

Nepalese commercial banks.

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