Impact of Technological Innovation on the Bank Performance: A Case of Nepalese Commercial Banks

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Abstract

This study examines theimpact of technological innovation on the bank performance: A case of Nepalese commercial banks. Banking performance is selected as dependent variable. Similarly, mobile banking, e-payment technology, internet banking, ATM banking, and point of sale banking are selected as independent variables. This study is based on primary data with 129 observations. 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 mobile banking, e-payment technology, internet banking, ATM banking, and point of sales on banking performance toward technological innovation on the bank performance of Nepalese commercial banks.

The study showed that mobile banking is positively correlated to banking performance. It indicates that organizations having technological innovation leads to increase on the bank performance. Likewise, e-payment technology is positively correlated to banking performance. It indicates that e-payment leads to an increase in technological innovation in the bank's performance. Similarly, internet banking is positively correlated to banking performance. It indicates that firms having technological innovation leads to an increase in banking performance of employees. Moreover, ATM banking is positively correlated to banking performance. It implies that innovation in technology leads to an increase in banking performance. Further, point of sale banking is also positively correlated to banking performance. It implies that technological innovation increases in banking performance of an employee.

Keywords: Mobile banking, e-payment technology, internet banking, ATM banking, point of sale banking, banking performance

1. Introduction

Technological innovation refers to the process through which technological advances are produced (Goh, 2002). Similarly, Sternthal (2001) defined technological innovations are usually used interchangeably in innovation process, such as: Technological change, technical progress,

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technological development or simply innovation. Likewise, In the financial services industry, innovation is viewed as the act of creating and popularizing new financial instruments, technologies, institutions and markets, which facilitate access to information, trading and means of payment (Solans, 2003). Furthermore, Hill & Utterback (2009) defined technological innovation as a major agent of development and change in societies which has been linked to rising productivity, employment growth and a strong position in export markets, trade and improved quality of life. Similarly, Chang & Hamid (2010) defined internet banking as the process through which customers complete banking transactions electronically without visiting the banks physically or without visiting brick and mortar bank.

Malhotra & Singh (2009) examined the current state of internet banking in India and discussed its implications for the Indian banking industry. The study showed that internet banking has a negative and significant impact on risk. The study also found that the adoption of internet banking has not increased the risk profile of banks. Similarly, Mwange (2013) examined the relationship between mobile banking technology and profitability commercial banks in Kenya. The study concluded that mobile banking offer banks several opportunities for increasing revenues. Moreover, Itah (2014) examined the impact of cashless banking on the profitability of banks in Nigeria. The study revealed that ATM and POS are positively related to ROE, while WBT online deposits have a negative impact on profitability of Nigerian banks. The study also concluded that ATM has a significant influence on performance of the banks whereas POS has an insignificant influence on performance of the banks.

Rauf *et al.* (2014) examined the impact of debit card usage on ROA of Pakistan banking industry by implying the regression analysis during the period of 2004 to 2013 quarterly. The study revealed that there is a significant relationship between debit card usage and profitability of the banking industry. Tunay *et al.* (2015) investigated the interaction between internet banking and bank performance. The study also showed that there is a significant relationship of internet banking with performance of the bank considering the whole sample. Similarly, Stoica *et al.* (2015) revealed efficient use of internet banking services helps to enhance a bank's overall performance i.e., productivity and profitability.

Dinh *et al.* (2015) examined the impact of internet banking on profitability of commercial banks in Vietnam. The result showed that

internet banking has a positive and significant impact on profitability. The study also showed adoption of internet banking helps to reduce operating costs due to cutting spending for operations and fixed assets at the bank branches Likewise, Morufu (2016) examined the impact of four (ATM, POS, web/Internet and mobile) e-payments adoption and banks specific variables on profitability of the Nigerian deposit's money banks. The study found that adoption of the four e-payment instruments like ATM, WEB, POS and mobile banking influence the performance of the banks. In addition, Harelimana (2017) examined the effect of mobile banking on the financial performance of Unguka bank limited. The study showed that there is a positive relation between mobile banking with productivity and profitability of the bank. The study also revealed that the increase in mobile banking shows an increment in sales volume, mobile banking products and growth in mobile networks.

Ijeoma (2018) examined the impact of the mobile banking on the financial performance of commercial banks in Kenya during a period of seven years. The study showed that mobile banking has a moderate and significant influence on profitability. Similarly, Harelimana (2018) examined the role of electronic payment system on the financial performance of financial institutions in Rwanda: A case study of Equity Bank Ltd. The study found that there is a positive and significant relationship between electronic payment and financial performance of the banks. Likewise, Mustapha (2018) investigated the effects of electronic payment platforms on bank performance. The result revealed that there is a positive relationship between electronic payment systems and the profitability of banks. Furthermore, Frank & Binaebi (2019) investigated the effect of electronic payment systems on the performance of commercial banks in Nigeria. The study concluded that the adoption of electronic payment has positively and significantly improved the returns on equity of Nigerian banks. Moreover, Thangaraj (2019) examined the causal relationship between digital payments and economic growth in India during the periods of 2011 to 2019. The study revealed that retail electronic payment has a significant and positive influence on real GDP. Similarly, Picoto & Pinto (2021) examined the impact of technology innovation on banking performance. The study showed that both the power distance and the long-term orientation have positive and significant influence on banking performance.

Makurumidze& Rwodzi (2023) investigated mobile banking and commercial banks' performance nexus in Zimbabwe for the period 2011-2021. The study concluded that there is a positive relationship between mobile

banking and commercial banks' performance. Similarly, Ong & Chong (2023) investigated the problems of cash transactions were the inconvenience of handling cash and the limited availability of banking services to facilitate cash withdrawals. The study showed that the internet and mobile banking delivery channels have significant influence on cashless payments. Similarly, Taiwo & Agwu (2017) found that there is a significant relationship between electronic transaction and profitability of the banks. Likewise, Simpson (2002) revealed that electronic banking is motivated largely by the prospects of operating costs minimization and operating revenues maximization. Furthermore, Gilaninia (2011) found that information technology impacts supply chain performance in an organization. Likewise, Melville *et al.* (2004) found that IT and the complementary resources of the firm affected the effectiveness of business processes with consequently improved organizational performance. Moreover, trained and empowered employees undertake creative initiatives, innovation and improve the productivity of the organization. (Chang *et al.,* 2011). Similarly, in the banking industry, providing high-quality innovative outputs improve the satisfaction level of employees that eventually increases the productivity of these employees (Obeng & Mkhize, 2017).

In the context of Nepal, Byanjankar & Sharma (2012) examined the possibility to improve functionality of mobile banking in Nepal. The study found that customers' trust on mobile banking to carry out financial activities is a major impact creating factor. Similarly, Dhungel *et al.* (2012) investigated the prospects and problems concerning the use of ATM and its impact on the productivity and profitability in Nepalese commercial banks. The study showed that the cost of the banks has reduced due to the large extent of use of ATM services. The study also found that ATM has a positive influence on productivity, probability and customer satisfaction of users. Moreover, Khatri & Dhungel (2013) examined the impact of internet banking on Nepalese banking sector and its usage and challenges in context of Nepal. The study revealed that limited services are provided by the BFIs through internet banking facilities. The study also found the challenges faced by the banks for the development and adaptation of internet banking technology.

Sherpa (2015) examined the information on the status of mobile banking in developing countries like Nepal as well as the impact of mobile banking in Nepalese society. The study concluded that there is a potential of development of mobile banking in Nepal. Similarly, Sapkota *et al.* (2018) explored the prevailing status of the use of POS banking in commercial banking services in Nepal. The study revealed that POS plays a positive role

towards enhancing productivity and attracting customers which ultimately increases the profitability of Nepalese commercial banks. Likewise, Dangol & Kautish (2019) investigated what the users of electronic payment think about the security and usefulness of payment via electronic methods in the context of Nepal. The study showed that the banks must also be educated to promote the benefits of e payments, training programs for its customers.

The above discussion shows that empirical evidence varies greatly across the studies concerning the impact of technological innovation on the bank performance. Though there are above mentioned empirical evidence in the context of other countries and in Nepal, no such evidence using more recent data exists in Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The major purpose of the study is to examine the impact of technological innovation on the bank performance of Nepalese commercial banks. Specifically, it examines the role of mobile banking, e-payment technology, internet banking, ATM banking and point of sale banking on applying technological innovation on banking 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 primary data. The data were gathered from 129 respondents through a questionnaire. The respondents' views were collected on mobile banking, e-payment technology, internet banking, ATM banking, and point of sale banking in technological innovation on bank performance: A case of Nepalese commercial banks. The study used descriptive and casual comparative research design.

The model

The model estimated in this study assumes that the banking performance depends on mobile banking, e-payment technology, internet banking, ATM banking, and point of sale. The dependent variable selected for the study is banking performance. Similarly, the selected independent variables on mobile banking, e-payment technology, internet banking, ATM banking, and point of sale. Therefore, the model takes the following form:

$BP = \beta_0 + \beta_1 MB + \beta_2 ET + \beta_3 IB + \beta_4 AB + \beta_5 POS$

Where,

BP = Banking performance

MB = Mobile banking

ET = E- payment technology

IB = Internet banking

AB = ATM banking

POS = Point of sales

Mobile banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly agree and 5 for strongly disagree. There are 5 items and sample items include "I can carry out my banking operations easily using mobile banking.", "I trust the network connectivity while doing a transaction using mobile banking" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.804$).

E-payment technology was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly agree and 5 for strongly disagree. There are 5 items and sample items include "E-payment system is better than cash and saves time", "E-banking services enhance banks competitive position in the market" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.832$).

ATM banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly agree and 5 for strongly disagree. There are 5 items and sample items include "ATM banking provides the customers with facility of withdrawing the money 24 hours a day, 7days a week through their debit cards", "My bank has located ATM machines in such place where customer can have easy access to it" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.847$).

Internet banking was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly agree and 5 for strongly disagree. There are 5 items and sample items include "Internet banking saves time and money", "Internet banking is more reliable and secured than traditional banking" and so on. The reliability of the items

was measured by computing the Cronbach's alpha ($\alpha = 0.864$).

Point of sales was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly agree and 5 for strongly disagree. There are 5 items and sample items include "POS in my bank manages employees, and offer customer rewards programs", "POS system maintains much needed accuracy by generating accurate reports in the banks" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.840$).

Banking performance was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 1 for strongly agree and 5 for strongly disagree. There are 5 items and sample items include "Mobile banking provides competitive advantage and increase performance of banks", "Increase in electronic banking services increases the performance of banks" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.860$).

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

Mobile banking

Mobile banking refers to provision of banking and bank related financial services with the help of mobile telecommunication devices. The scope of services may include facilities to conduct bank and stock market transactions to administer their accounts and access customized information (Porteous, 2006). Furthermore, Daniyan *et al.* (2017) revealed that mobile banking positively and significantly affects the productivity and profitability of the commercial banks in Nigeria. Likewise, Wadhwa (2016) showed that mobile banking has an insignificant influence on improvising the profitability of the banks. Furthermore, Abubakar (2014) revealed that there is a positive relationship between mobile banking and total deposits. Based on it, following hypothesis have been developed:

H_1: There is a positive relationship between mobile banking technology and banking performance.

E-payment technology

According to the Champan (1996), electronic payment system is a form of inter-organizational information system for monetary exchange, linking many organizations and individual users. Similarly, electronic payment is

defined as a financial exchange that takes place online between buyers and sellers (Deb & Jain, 2011). Likewise, Frank & Binaebi (2019) concluded that the adoption of electronic payment has positively and significantly improved the returns on equity of Nigerian banks. Similarly, Mustapha (2018) revealed that introduction of electronic payment systems into the financial sector leads to increase in the profitability and productivity of banks. Furthermore, Nzaro & Magidi (2014) found that there is a positive relationship between electronic payment systems with bank's profitability and productivity. Based on it, following hypothesis have been developed:

H_2: There is a positive relationship between electronic payment system and banking performance.

Internet banking

According to Kim *et al.* (2006), internet banking is the process whereby the customer is able to access, control and use his or her account over the internet. Similarly, Murat & Isaac (2019) found that internet banking has a significant and positive influence on the performance of the banks. Likewise, Noah *et al*. (2019) found that internet banking has a significant and positive influence on productivity through efficiency and profitability. Moreover, Mateka *et al*. (2016) found that internet banking has a positive impact on bank's and productivity and profitability i.e. incomes, operating costs, and loan book and customer deposits. Likewise, Dinh *et al.* (2015) concluded that there is a positive and significant impact of internet banking on bank's productivity and profitability. The study also showed that adoption of internet banking helps to reduce operating costs due to cutting spending for operations and fixed assets at the bank branches. Based on it, following hypothesis have been developed:

H_3: There is a positive relationship between internet banking and banking performance.

ATM banking

According to Cronin (1997), ATM is a computerized telecommunication device that provides the customer of a financial institution with access to financial transactions in a public space without the need for a human cashier, clerk or bank teller. Similarly, Emmanuel & Mulyungi (2019) found that there is a positive relationship between ATM services and growth and sustainability of Ecobank. Likewise, Mwai *et al.* (2018) showed that online banking has a significant influence on the financial deepening of commercial banks in

Kenya. Moreover, Abdullai & Nyaoga (2017) concluded that the adoption of automated teller machines has a positive influence on operational performance. Based on it, following hypothesis have been developed:

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

POS banking

Point of sale (POS) defined as a retail payment device which reads a customer's bank's name and account number when a bank card or credit card is swiped passed through a magnetic stripe reader (Saleem *et al.,* 2019). Likewise, Njoroge & Mugambi (2018) revealed that there is a positive relationship between POS and the bank performance in Kenya. Furthermore, Okon & Amaegberi (2018) concluded that there is a positive and statistically significant relationship between point of sale of old and new generation bank in Nigeria. Similarly, Jenevive & Anyanwaokoro (2017) showed that there is an insignificant relationship between POS payment method and profitability of commercial banks in Nigeria. Likewise, Atavachi (2013) revealed that there is a negative relationship between POS banking and financial performance of deposit (microfinance institutions) in Kenya. Based on it, following hypothesis have been developed:

$H_{5:}$ There is a positive relationship between POS banking and banking performance.

3. Results and discussion

Correlation analysis

Correlation is a term that refers to the strength of a relationship between two variables. A strong or high correlation means that two or more variables have strong relationship with each other, while a weak or low correlation means that the variables are hardly related.

Table 1: shows the computation of Kendall's Tau correlation coefficients of impact of innovation and technology on banking performance in Nepalese commercial banks.

Table 1

Kendall's Tau correlation coefficients matrix

This table presents Kendall's Tau correlation coefficients between dependent variable and independent variables. The correlation coefficients are based on 129 observations.

The dependent variables is BP (Banking performance). The independent variables are MB (Mobile Banking), ET (E-Payment), IB (Internet Banking), ATM (Automated Teller Machine), and POS (Point of Sales).

Variables	Mean	SD	BP	MB	ET	IB	ATM	POS
BP	4.034	0.678	1					
MB	4.112	0.6239	0.385**	1				
ET	4.074	0.6413	0.466**	0.563**	1			
IB	4.005	0.6579	0.599**	0.464**	0.555**	1		
ATM	3.988	0.6949	0.488**	0.474**	0.578**	0.596**	1	
POS	3.986	0.6306	0.548**	0.391**	0.546**	0.543**	0.524**	1

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

Table 1 shows the Kendall's Tau correlation coefficients of dependent and independent variables for banking performance.The study indicatesthat internet banking is positively correlated to bank performance indicating that the implementation of internet banking impact on bank performance. Similarly, ATM services are positively correlated to bank performance. This implies that better ATM services leads to increase in bank performance.similarly, mobile banking is positively correlated to bank performance. This implies that that better mobile banking services leads to increase in bank performance. Likewise, point of sale is positively correlated to bank performance which indicates that increase in point of sale services in retail stores leads to increase in bank performance. Similarly, e-payment technology is positive correlated with bank performance which indicates that better e-payment technology leads to increase in bank performance.

Regression analysis

Regression analysis is a statistical process for estimating the relationships among variables. The regression results were estimated where mobile banking, e-payment banking, internet banking, ATM banking and POS banking are used as independent variables and dependent variable banking performance.

The regression result of effect of innovation and technology onbanking performance in Nepalese commercial banks is shown in table 2

Table 2

Regression results ofmobile banking, e-payment banking, internet banking, ATM banking and POS banking on banking performance in Nepalese commercial banks

The results are based on 129 observations using linear regression model. The model is $BP = \beta_0 + \beta_1 MB + \beta_2 EB + \beta_3 IB + \beta_4 ATM + \beta_5 POS + \varepsilon$, where the dependent variable is BP is banking performance. The independent variables are MB (Mobile Banking), ET (E-Payment), IB (Internet Banking), ATM (Automated Teller Machine), and POS (Point of Sales).

Model	Intercept	Regression coefficients of					Adj. R_bar2	SEE	F-value
		MB	ET	ATM	IT	POS			
1	1.682 (4.936)	0.572 (6.981)					0.272	0.57894	48.737
2	1.227 (4.183)		0.689 (9.688)				0.420	0.51603	93.853
3	1.610 (5.879)			0.608 (8.979)			0.384	0.53221	80.630
4	0.869 (3.652)				0.790 (13.472)		0.585	0.43663	34.598
5	0.765 (3.074)					0.820 (13.301)	0.579	0.43990	34.234
6	1.104 (3.450	0.105 (0.960)	0.614 (5.788)				0.579	0.51619	47.359
7	0.818 (3.319)			0.072 (0.820)	0.731 (7.887)		0.584	0.43719	90.843
8	0.411 (1.450)	0.050 (0.469)				0.726 (10.114)	0.595	0.43146	94.957
9	0.946 (3.020)	0.050 (0.469)	0.415 (3.454)	0.298 (3.148)			0.458	0.49885	37.107
10	0.204 (0.796)	0.056 (0.816)			0.445 (5.640)	0.456 (5.687)	0.674	0.38676	89.387

Notes:

i. Figures in parenthesis are t-values
ii. The asterisk signs (**) and (*) indicate that the results are significant at 1 percent and 5 percent level respectively.
iii. Banking performance is dependent variable.

The regression results show that the beta coefficients for mobile banking are positive with banking performance. It indicates that mobile banking has a positive impact on banking performance. This finding is similar to the findings of Ijeoma (2018) and Mwange (2013). Likewise, the beta coefficients for e-payment technology are positive with banking performance. It indicates that e-payment technology has a positive impact on banking performance. This finding is consistent with the findings of Thangaraj (2019). Similarly, the beta coefficients for internet banking are positive with banking performance. It indicates that internet banking has a positive impact on banking performance. This result is consistent with the findings of Malhotra and Singh (2009). Further, the beta coefficients for ATM are positive with banking performance. It indicates that ATM has a positive impact on banking performance. This finding is inconsistent to the findings of Moore *et al.* (2003). In addition, the beta coefficients for point of sales are positive with banking performance. It indicates that point of sales has a positive impact on banking performance. This finding is similar to the findings of Valahzaghard & Bilandi (2014)

4. Summary and conclusion

This chapter presents the brief summary of the entire study and highlights major findings of the study. Moreover, the major conclusions are discussed in separate section of this chapter that is followed by some implications and the recommendations regarding the impact of innovation and technology on banking performance in Nepalese commercial banks. Finally, the chapter ends with the scope of the future research in same field.

This study attempts to examine the impact of technological innovation on banking performance of Nepalese commercial banks. The study is based on primary data with 129 observations.

The study also showed that mobile banking, e-payment technology, internet banking, ATM banking, and point of sale banking has positive relationship with banking performance. The study concluded that proper implementation of mobile banking, e-payment technology, internet banking, ATM banking, and point of sale bankinghave a significant impact in increasing banking performance. The study also concluded that the most influencingfactor is ATM banking followed by point ofsale banking, internet banking and mobile banking that explain the betterbanking performance.

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