Role of Wireless Network and Technology for Development of Business Sector in Kathmandu Valley

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Abstract

This study examines the role of wireless network and technology for development of business sector in Kathmandu Valley. Business growth and development is the dependent variable. The selected independent variables are adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends. The primary source of data is used to assess the opinions of respondents regarding adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends. The study is based on primary data of 123 respondents. To achieve the purpose of the study, structured questionnaire is prepared. The correlation and multiple regression models are estimated to test the significance and importance of role of wireless network and technology for development of business sector in Kathmandu Valley.

The study showed a positive impact of adoption and implementation of wireless technology on business growth and development. It indicates that high adoption and implementation of wireless technology, higher would be the level of business growth and development. Similarly, the study showed a positive impact of type of wireless technology used on business growth and development. It indicates that quality type of wireless technology to the customers leads to increase in business growth and development. Likewise, the study showed a positive impact of level of investment on business growth and development. It indicates that higher the level of investment in wireless technology, higher would be the level of business growth and development. Further, the study showed a positive impact of training and education on business growth and development. It indicates that positive perception on training and education leads to increase in business growth and development. Moreover, the study showed a positive impact of market and industry trends on business growth and development. It indicates that market and industrial trend in wireless technology adoption and usage leads to increase in the level of business growth and development.

Keywords: adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education

1. Introduction

Wireless technology refers to the use of wireless communication technologies, such as Wi-Fi, Bluetooth, and RFID (Radio Frequency Identification), to enable the transmission of data and information without the need for physical connections or wires (Sai and Chuang, 2007). Lusch *et al.* (2010) defines wireless technology as the use of electromagnetic waves

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to transmit data and communicate between devices without the need for physical, wired connections. Similarly, Sai and Chuang (2007) stated that the adoption of wireless technology in the Taiwanese healthcare industry improves supply chain management by enhancing communication, visibility, and decision-making processes. Likewise, He and Xu (2013) examined the influence of wireless technology on productivity, exploring its impact on work efficiency and outcomes in a concise manner. The study found that the adoption of wireless technology has a positive impact on productivity, leading to increased efficiency and improved work outcomes. Likewise, Raghavan and Tucci (2014) analyzed the role of wireless carriers in the adoption of mobile payment platforms, using Google Wallet as a case study. The study indicated that the involvement and support of wireless carriers are crucial for the successful adoption and widespread use of mobile payment platforms like Google Wallet. Moreover, Shukla *et al.* (2019) explored the adoption of wireless technology by small businesses, highlighting the factors influencing their decision-making process and the potential benefits derived from its implementation. The study found that small businesses that adopt wireless technology experience improved operational efficiency, increased communication capabilities, and enhanced competitiveness in the market.

Karakaya and Yilmaz (2019) examined the impact of wireless technology on supply chain management. The study highlighting its potential to enhance visibility, coordination, and responsiveness throughout the supply chain network and found that the adoption of wireless technology in supply chain management improves real-time visibility, enables better coordination among supply chain partners, and enhances overall supply chain performance. Similarly, Meulen (2019) analyzed the role of wireless networks in business operations. The study stated a significance in enabling mobile connectivity, seamless communication, and efficient data transfer for enhanced productivity and agility. Likewise, Kim and Choi (2019) examined the implementation of wireless technology in the healthcare industry faces significant challenges in terms of network reliability and security. The study found that the reliance on wireless networks for transmitting critical patient data and communication between medical devices can lead to network congestion and interruptions, compromising the quality of healthcare services. Further, Iivari and Kärkkäinen (2016) investigated the problems and challenges associated with wireless technology adoption in the business environment. The study found to provide insights into potential strategies and solutions for overcoming these challenges, ultimately improving the adoption and effective utilization of wireless technology in the business. Likewise, Crittenden (2016) analyzed

the impact of wireless technology on the performance of salespeople. The study found that the use of wireless technology enabled salespeople to access real-time information, communicate more effectively with customers, and enhance their overall productivity and sales performance.

Tang and Seay (2010) investigated the impact of wireless handheld technology on the safety perceptions and performance of hospital care workers. The study found that the implementation of wireless handheld technology positively influenced the safety perceptions of hospital care workers, leading to improved performance in terms of patient care and overall work efficiency. Similarly, Raghavan and Tucci (2014) stated that wireless networks and technology play a crucial role in the development of the business sector and provide numerous advantages such as mobility, seamless collaboration, and access to critical information from anywhere. Likewise, Fay and Morrison (2015) stated that the adoption of wireless technology contributes to business growth by enhancing agility, customer experience, and operational efficiency. Further, Garrahan and Stewart (2010) examined the impact of wireless technology on the retail workplace from a strategic perspective. The study found that the strategic implementation of wireless technology in the retail workplace has a significant positive impact on operational efficiency, customer service, and overall competitive advantage. Moreover, Lai and Wang (2014) assessed the factors that influence engineers' acceptance of asynchronous wireless technology for knowledge sharing. The study found that factors such as perceived usefulness, ease of use, compatibility with existing systems, and perceived trust significantly influenced engineers' acceptance of asynchronous wireless technology for knowledge sharing.

In the context of Nepal, Bhattarai and Timilsina (2010) examined the role of wireless networks in the growth of small and medium-sized enterprises in Nepal. The study found that the adoption of wireless networks positively contributed to the growth and success of small and medium-sized enterprises in Nepal. Similarly, Shrestha *et al.* (2012) found that wireless technology had a significant impact on the development of e-commerce in Nepal. Likewise, Dahal and Koirala (2011) examined the adoption of wireless technology and its impact on business performance in Nepal. The study found that the adoption of wireless technology positively impacted business performance in Nepal. Similarly, Shrestha and Bhattarai (2018) investigated the challenges faced by small and medium enterprises (SMEs) in Nepal when adopting wireless networks and technology for business development. The study found that the challenges faced by small and medium enterprises (SMEs) in Nepal in adopting wireless networks and technology for business

development include limited financial resources, lack of technical expertise, and inadequate infrastructure support. Further, Shakya and Poudel (2019 analyzed the consequences of limited internet connectivity on the effective utilization of wireless networks for business growth in rural areas of Nepal. The findings of the study revealed that the lack of reliable and affordable internet connectivity significantly hindered the adoption and utilization of wireless networks for business purposes in rural Nepal. Moreover, Bista and Acharya (2017) examined the security concerns and risks faced by Nepalese businesses in the adoption of wireless networks and technology. The findings of the study revealed that Nepalese businesses encountered various security challenges and risks in the implementation and use of wireless networks.

The above discussion shows that empirical evidences vary greatly across the studies on the role of wireless network and technology for development of business sector. Though there are above mentioned empirical evidences in the context of other countries and in Nepal, no such findings using more recent data exists in the context of Nepal. Therefore, in order to support one view or the other, this study has been conducted.

The major objective of the study is to examine the role of wireless network and technology for development of business sector in Kathmandu Valley. Specifically, it examines the relationship of adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends with business growth and development in Kathmandu Valley.

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

2. Methodological aspects

The study is based on the primary data which were collected from 123 respondents through questionnaire. The study employed convenience sampling method. The respondents' views were collected on adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, market and industry trends and business growth and development. This study is based on descriptive as well as causal comparative research designs.

The model

The model used in this study assumes that business growth and development depends upon role of wireless network and technology. The

dependent variable selected for the study is business growth and development. Similarly, the selected independent variables are adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends. Therefore, the model takes the following form:

Business growth and development = *f (*AI, TWT, LI, TE and MI)

More specifically,

$BGD = \beta_0 + \beta_1 AI + \beta_2 TWT + \beta_3 LI + \beta_4 TE + \beta_5 MI + e$

Where,

BGD =Business growth and development

AI = Adoption and implementation

TWT = Type of wireless technology used

LI = Level of investment

TE = Training and education

MI = Market and industrial trend

Business growth and development was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 5 for strongly agree and 1 for strongly disagree. There are 5 items and sample items include "The use of wireless technology has significantly improved the efficiency and productivity of businesses", "Wireless networks play a crucial role in enhancing communication and collaboration within the business sector" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.704$).

Adoption and implementation were measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 5 for strongly agree and 1 for strongly disagree. There are 5 items and sample items include "The adoption of wireless technology has significantly improved the operational efficiency of businesses", "Wireless technology has facilitated better communication and collaboration within organizations" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.724$).

Type of wireless technology used was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 5 for strongly agree and 1 for strongly disagree. There are 5 items and sample items include "The use of Wi-Fi technology has been effective in supporting the growth and development of businesses", "Bluetooth technology is a valuable

tool for enhancing connectivity and communication within the business sector" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.755$).

Level of investment was measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 5 for strongly agree and 1 for strongly disagree. There are 5 items and sample items include "Investing in wireless technology is crucial for the growth and success of businesses in today's digital era", "Increasing the level of investment in wireless technology will lead to improved operational efficiency and productivity within the business sector" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.676$).

Training and education were measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 5 for strongly agree and 1 for strongly disagree. There are 5 items and sample items include "Providing training and education on wireless technology is essential for businesses to effectively utilize and leverage its benefits", "Businesses that invest in training their employees on wireless technology gain a competitive advantage in the market" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.777$).

Market and industrial trend were measured using a 5-point Likert scale where the respondents were asked to indicate the responses using 5 for strongly agree and 1 for strongly disagree. There are 5 items and sample items include "The market and industry trends indicate a growing demand for businesses to adopt wireless technology", "Staying updated with the latest market and industry trends in wireless technology is crucial for businesses to remain competitive" and so on. The reliability of the items was measured by computing the Cronbach's alpha ($\alpha = 0.730$).

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

Adoption and implementation

Adoption and implementation of wireless network and technology is the incorporation and utilization of wireless communication systems and technologies, such as Wi-Fi, Bluetooth, and cellular networks, to establish wireless connectivity and facilitate data transfer and communication within an organization or across various industries (Wang *et al.*, 2017). Aral and Weill (2007) investigated the correlation between IT assets. The study revealed that variations in firm performance can be attributed to the allocation of IT assets and the presence of distinctive organizational capabilities within the

organization. Similarly, Chen and Kuo (2012) examined the impact of wireless network implementation on organizational performance. The study found that the implementation of wireless networks positively affects operational efficiency and employee productivity in organizations. Further, Farhoomand and Drury (2002) found that the implementation of mobile technology in Daewoo Motors had a significant positive impact on the company's organizational processes and electronic commerce activities. Moreover, Bughin *et al.* (2017) examined the impact of automation on employment and productivity, the study found that the potential for significant shifts in the future workforce. In addition, Cao and Li (2018) investigated the adoption and implications of wireless technology in supply chain management. The study found that its impact on real-time tracking, inventory management, and enhanced coordination among supply chain partners. Based on it, this study develops the following hypothesis:

H_1: There is a positive relationship between adoption and implementation and business growth and development.

Type of wireless technology used

Wireless technology refers to the communication of data or information between devices without the need for physical wired connections. There are various types of wireless technologies (Wi-Fi, Bluetooth, cellular networks, etc.) that serve different purposes and operate on different frequencies (Erol *et al.*, 2018). Erol *et al.* (2018) examined the impact of 5G wireless technology on productivity and economic growth, revealing that it serves as an enabler, leading to higher levels of productivity and economic growth. Likewise, Chen and Kumar (2017) analyzed the impact of Wi-Fi technology adoption in developing countries. The study found a positive association with economic development indicators such as GDP growth and employment. Further, Bharti and Asghar (2018) found that the adoption and implementation of 4G wireless technology in India has a positive impact on economic growth, highlighting the significant relationship between technological advancements in the wireless sector and business growth. Likewise, Rana *et al.* (2016) investigated the relationship between broadband infrastructure, including wireless technologies, and growth and competitiveness across multiple industries. The study found a positive impact of wireless technology on business development. Similarly, Lee and Ha (2019) examined the impact of wireless technology, particularly in the context of e-commerce, on customer satisfaction and loyalty and found that the implementation of wireless technology in e-commerce positively affects customer satisfaction and loyalty,

emphasizing the importance of meeting consumer expectations. Based on it, this study develops the following hypothesis:

H_2: There is a positive relationship between type of wireless technology used and business growth and development.

Level of investment

Level of investment refers to the magnitude of financial resources devoted to investment projects and activities. It represents the size and scale of the commitment made by investors to allocate capital to different asset classes such as stocks, bonds, real estate, or business ventures (Mishra *et al., 2*019). Wu and Kim (2018) analyzed the impact of investment in wireless technology on firm performance and found a positive impact of level of investment on firm performance through a dynamic panel analysis. Similarly, Martinez and Becherer (2015) investigated the relationship between wireless technology adoption and firm performance. The study revealed a positive impact of level of investment on operational efficiency, innovation, and market share. Likewise, Qu and Zhang (2019) assessed the relationship between investment in wireless communication technology and firm innovation. The study revealed a positive association between level of investment and business development. Moreover, Czernich *et al.* (2011) determined the impact of broadband infrastructure investment, including wireless technologies, on economic growth. The study found a positive relationship between investment and business development. Furthermore, Roso and O'Cass (2013) found that wireless technology and social network integration positively impacts firm performance, contributing to business growth and development. Likewise, Kuan and Bock (2007) investigated the role of trust in the before-online-visit phase of brick and click retailers. The study found that trust transfer from offline to online channels positively influences customer loyalty and business growth. Based on it, this study develops the following hypothesis:

H_3: There is a positive relationship between level of investment and business growth and development.

Training and education

Training and education on wireless technology encompasses the study and practical application of concepts, protocols, and techniques used in wireless communication systems, including radio frequency (RF) propagation, modulation schemes, signal processing, network architectures, and system design (Rappaport, 2002). Mishra and Seth (2017) examined the relationship between information technology education, including wireless technology, and firm performance. The study found a positive impact of training and

development on business growth. Likewise, Bélanger *et al.* (2009 explored the impact of training on wireless technology acceptance, demonstrating that effective training programs can lead to increased adoption and utilization of wireless technology, contributing to business development. Similarly, Melville *et al.* (2004) found that the effective utilization of information technology (IT) is positively associated with business growth and development. Moreover, Kong *et al*. (2019) found a positive impact of training and development on business growth. Further, Al-Emran and Mezhuyev (2020) determined the impact of IT training on job satisfaction and employee performance in the banking sector, emphasizing its positive association with business outcomes such as employee productivity and customer satisfaction. Similarly, Harris *et al.* (2011) investigated the impact of IT training on business value and found that IT training positively affects business value based on evidence from a field experiment. Moreover, Ali and Ahmed (2017) examined the impact of IT training on employees' job satisfaction and productivity in the banking sector of Saudi Arabia. The study revealed a positive correlation between IT training and both job satisfaction and productivity. Based on it, this study develops the following hypothesis:

H_4: There is a positive relationship between training and education and business growth and development.

Market and industry trends

Market and industry trends in wireless technology refer to the current developments, advancements, and shifts in the wireless communication sector. Lee and Kim (2007) examined the impact of market and industry trends in wireless technology adoption, specifically in the context of mobile banking, on customer trust and satisfaction, highlighting their influence on business growth. Likewise, Lu *et al.* (2017) found a positive relationship between market and industry trends and business growth. Similarly, Porter (2001) argued that the internet fundamentally changes the competitive dynamics of industries, requiring businesses to develop new strategic approaches to create and sustain competitive advantage. Further, O'Donnell and O'Kelly (2019) determined the impact of digital transformation on small and medium-sized enterprises (SMEs) in Ireland. The study found a positive impact of market trend on business growth. Likewise, Banerjee *et al.* (2019) found that the use of wireless technology positively impacts firm performance, contributing to business growth and development from a dynamic capability's perspective. Likewise, Teo *et al.* (2003) found that adopting inter-organizational linkages is positively associated with business growth and development, from an

institutional perspective. Based on it, this study develops the following hypothesis:

H_5: There is a positive relationship between market and industry trends and business growth and development.

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 mean and standard deviation has been computed and the results are presented in Table 1.

Table 1

Kendall's Tau correlation coefficients matrix

This table presents Kendall's Tau coefficients between dependent variable and independent variables. The dependent variable is BGD (Business growth and development)). The independent variables are AI (Adoption and implementation), TWT (Type of wireless technology used), LI (Level of investment), TE (Training and education) and MI (Market and industrial trend).

Variables	Mean	S.D.	BGD	AI	TWT	LI	TE	MI
BGD	3.479	0.770	1					
AI	3.600	0.764	0.479**	1				
TWT	3.491	0.798	0.404**	0.462**	1			
LI	3.539	0.710	0.457**	0.474**	0.476**	1		
TE	3.554	0.797	0.405**	0.494**	0.469**	0.465**	1	
MI	3.552	0.750	0.410**	0.457**	0.493**	0.463**	0.499**	1

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

Table 1 shows that adoption and implementation of wireless technology is positively correlated to business growth and development. It indicates that high adoption and implementation of wireless technology, higher would be the level of business growth and development. Similarly, type of wireless technology used is positively correlated to business growth and development. It indicates that quality type of wireless technology to the customers leads to increase in business growth and development. Likewise, level of investment is positively correlated to business growth and development. It indicates that higher the level of investment in wireless technology, higher would be the level of business growth and development. Further, training and education is positively correlated to business growth and development. It indicates that positive perception on training and education leads to increase in business growth and development. In addition, market and industrial trend is positively

correlated to business growth and development. It indicates that market and industrial trend in wireless technology adoption and usage leads to increase in the level of business growth and development.

Regression analysis

Regression analysis is a statistical process for estimating the relationships among variables. The regression results were estimated where adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends are used as independent variables and business growth and development is used as dependent variable.

The regression result for adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends on business growth and development is shown in the Table 2.

Table 2

Estimated regression results of adoption and implementation of wireless technology, type of wireless technology used, level of investment, training and education, and market and industry trends on business growth and development

The results are based on the responses gathered from 123 respondents by using linear regression model. The model is BGD= $\beta_0 + \beta_1$ AI + β_2 TWT + β_3 LI + β_4 TE + β_5 MI + e whereas the dependent variable is BGD (Business growth and development)). The independent variables are AI (Adoption and implementation), TWT (Type of wireless technology used), LI (Level of investment), TE (Training and education) and MI (Market and industrial trend).

Model	Intercept	Regression coefficients of					Adj. R_bar2	SEE	F-value
		AI	TWT	LI	TE	MI			
1	1.207 (4.590) **	0.631 (8.834) **					0.387	0.603	78.036
2	1.616 (6.166) **		0.534 (7.290) **				0.299	0.645	53.138
3	1.088 (3.899) **			0.676 (8.741) **			0.382	0.606	76.412
4	1.590 (5.946) **				0.532 (7.241) **		0.297	0.646	52.438
5	1.420 (5.069) **					0.580 (7.510) **	0.312	0.639	56.394
6	0.935 (3.433) **	0.465 (5.163) **	0.249 (2.882) **				0.422	0.586	45.528
7	0.489 (1.739)	0.315 (3.376) **	0.160 (1.890)	0.367 (3.947) **			0.485	0.553	39.234
8	0.474 (1.672)	0.293 (2.861) **	0.145 (1.618)	0.357 (3.747) **	0.051 (0.522)		0.481	0.555	29.314
9	0.434 (1.516)	0.287 (2.796) **	0.122 (1.317)	0.326 (3.233) **	0.024 (0.236)	0.097 (0.094)	0.481	0.555	23.586

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. *Business growth and development is dependent variable.*

The regression results show that the beta coefficients for adaption and implementation are positive with business growth and development. It indicates that adaption and implementation have positive impact on business growth and development. This finding is consistent with the findings of Bughin *et al.* (2018). Similarly, the beta coefficients for type of wireless technology used are positive with business growth and development. It indicates that type of wireless technology used have positive impact on business growth and development. This finding is similar to the findings of Erol *et al.* (2018). Likewise, the result shows that the beta coefficients for level of investment are positive with business growth and development. It indicates that level of investment has a positive impact on business growth and development. This finding is consistent with the findings of Baumol and Strom (2007). Further, the beta coefficient for training and education are positive with business growth and development. It indicates that training and education has a positive impact on business growth and development. This finding is consistent with the findings of Kong *et al.* (2019). In addition, the beta coefficient for market and industrial trend is positive with business growth and development. It indicates that market and industrial trend has a positive impact on business growth and development. This finding is similar to the findings of Banerjee *et al.* (2019).

4. Summary and conclusion

Wireless technology refers to the use of wireless communication technologies, such as Wi-Fi, Bluetooth, and RFID (Radio Frequency Identification), to enable the transmission of data and information without the need for physical connections or wires (Sai and Chuang, 2007). Lusch *et al.* (2010) defines wireless technology as the use of electromagnetic waves to transmit data and communicate between devices without the need for physical, wired connections.

This study attempts to examine the role of wireless network and technology for development of business sector in Kathmandu Valley. The study is based on primary data of 123 respondents.

The major conclusion of the study is that adoption and implementation of wireless technology, type of wireless technology, level of investment in wireless technology, training and education on wireless technology, market and industry trends in wireless technology adoption and usage have positive impact on business growth and development. The study also concludes that level of investment in wireless technology followed by adoption and implementation of wireless technology is the most influencing factors that

affect the business growth and development.

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