Factor Affecting Technology Advancement in Digital Age: A Case of Nepal

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Abstract

This study examines the factors affecting technology advancement in digital age in Nepal. Technology advancement in digital age is the dependable variable. The independent variables are decision making, online/ distance education, technological innovation, communication and economic growth. The primary source of data is used to assess the opinions of the respondents regarding the factors affecting technology advancement in digital age in Nepal. The study is based on primary data of 166 respondents. To achieve the purpose of the study, structured questionnaire is prepared. The correlation coefficients and regression models are estimated to test the different factors affecting technology advancement in digital age in Nepal.

The result shows that decision making has a positive impact on technology advancement in digital age. It indicates that better decision making leads to increase technology advancement in digital age. Similarly, online/ distance education has a positive impact on technology advancement in digital age. It shows that increase in online/ distance education leads to increase in technology advancement. Likewise, technological innovation has a positive impact on technology advancement in digital age. It implies that increase in technological innovation leads to higher technology advancement in digital age. Further, communication has a positive impact on technology advancement in digital age. It means that effective communication leads to increase in technology advancement in digital age. Moreover, economic growth has a positive impact on technology advancement in digital age. It indicates that increase in economic growth leads to increase in technology advancement in digital age.

Keywords: technology advancement, decision making, online/distance education, technological innovation, communication, economic growth.

1.Introducation

Technology advancement refers to the continuous improvement, development, and application of new tools, systems, processes, and methods in various fields. Technology advancements in the Digital Age have dramatically transformed the way we live, work, and interact with the world around us. From the rise of the internet to the proliferation of artificial intelligence, the digital era has ushered in unprecedented innovation. The word development implies progress or advance and may be defined as the overall activity in a society, consciously or subconsciously undertaken, aimed at improvements in that society (Stec *et al*. 2014). The technology has contributed itmmensely to the development of various nations. The role of a technologically educated population in promoting social and economic development has long been recognized (Miah and Omar, 2012). The digitalization of the economy has been a transformative force, contributing to both short-term and long-term economic prosperity in developed and developing countries alike (Mgadmi *et al*., 2021). The proliferation of the internet and mobile technology has not only enhanced productivity and innovation but has also led to the emergence of new industries and the disruption of traditional ones (Firmansyah *et al.,* 2021). The review will draw on theoretical frameworks and empirical evidence to understand the impact of digital communication on the U.S. economy, with a particular focus on how it has influenced GDP growth, employment, productivity, and efficiency (Irtyshcheva *et al*., 2021). According to Ghalandari (2022), describe the adoption of O2O (online to

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offline) digital wallets, where, apart from being used for digital transactions, digital wallets can also be used as a means of payment at offline merchants such as MSMEs, minimarkets and other shops.

Muhibbullah *et al*. (2021) analysed that the quality of higher education: Improving the well-being through humanizing digital entrepreneurship program. The study defined that the traditional entrepreneurs into digital entrepreneurs, it is important for entrepreneurs to understand the concepts of digital marketing, Business Model Canvas, and the design thinking process. Similarly, Thong and Xu (2022) evaluated that the consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. The study stated that, in the context of digital wallet adoption, the factors include the availability of technological infrastructure that allows users to use digital wallets easily and support from related parties such as merchants and the government. Likewise, Berndt *et al*. (2010) evaluated that the customers readiness towards the adoption of new banking technology. The study found that factors such as optimism, innovation are the key drives whereas factors like discomfort and insecurity are inhibitors for customers' technology readiness index and the study also showed that majority of the respondents are embracing and adopting modern technology. Further, Madyatmadja *et al.* (2020) studied that the risk analysis of human resource information systems using COBIT 5. The stated that utilizing a digital wallet, users can carry out various transactions, such as transportation payments, food shopping, online payments, and payments at merchants that accept digital payments. Moreover, Nurdiani (2021) investigated that the integrating marketing and finance to increase company performance in Vuca World: A case study on banking state-owned enterprise in Indonesia. The study found that the Internet provides various types of entertainment, such as video streaming, online games, and social media, allowing people to relax and entertain themselves without having to leave the house. The study also stated that with the continued development of technology and the Internet, more positive changes are hoped to bring progress in various aspects of human life. Additionally, Jayakumar (2018) studied that the attitude of consumers towards internet shopping in Chennai city of Tamilnadu. The study argued that the internet shopping was positively and significantly related to age, gender, and monthly income. The study also found that the internet shopping negatively related to educational qualification, the size of the family, and the nature of the family.

Gilitwala (2020) examined that the e-wallet- factors affecting its intention to use. The study showed that the rapid and widespread adoption of fintech technology in Indonesia, which facilitates financial transactions and opens new opportunities in this industry. Similarly, Wong *et al.* (2015) analysed that the Internet supervision and parenting in the digital age: The case of Shanghai. The study suggested that efforts in assisting parents review their attitude towards the Internet and learn new supervision methods are important, especially for parents on the lower socio-economic strata. Likewise, Terziev *et al.* (2020) examined that the change management and digital age training. The study concluded that have been reached represent a relevant starting point for future action in the framework of educational activities, policies and prospects. Further, Okoro *et al*. (2023) anlyazed that the Digital communication and us economic growth: A comprehensive exploration of technology's impact on economic advancement. The study implied that digital communication not only serves as a driver of economic efficiency and innovation but also poses new challenges that require adaptive and forward-thinking policy responses. Moreover, Timotheou *et al.* (2023) examined that

the impacts of digital technologies on education and factors influencing schools' digital capacity and transformation. The study provided that in-depth data about the impact of digital technologies on education. In addition, Heavin and Power (2018) evaluated that the challenges for digital transformation–towards a conceptual decision support guide for managers. The study stated that digital transformation has forced us to change the way organizations operate, to the extent that becoming a fundamental part of corporate strategy. Additionally, Sahut *et al*. (2021) examined that how entrepreneurship is enabled and transformed by digitalisation using the lens of entrepreneurial marketing. The study suggested that firms expanding their network resources through the open nature of the platform can aid them to develop new opportunities in the digital economy, concurring with the assertions of entrepreneurship scholars.

Parry and Strohmeier (2014) analyzed that HRM in the digital age–digital changes and challenges of the HR profession. The study showed that the influence of changes arising from HRM digital transformation, highlighting some of the challenges facing HRM in the future. Similarly, Boakye and Lamptey (2020) examined that the rise of HR analytics: Exploring its implications from a developing country perspective. The study stated that developing countries, companies are facing different challenges to adopt HR analytics, for instance, lack of analytical skills, lack of management support, lack of valid and complete data, and lack of technology tools available for HR Analytics. Likewise, Mikalef and Krogstie (2020) examined that the interplay between big data analytics and contextual factors in driving process innovation capabilities. The revealed that to achieve progressive innovation, data extraction culture should be adopted which is one of the most important factors for determining overall success with firm's goals and strategies. Further, Karadağ *et al*. (2015) assessed that the determinants of phubbing, which is the sum of many virtual addictions: A Structural Equation Model. The study stated that the use of a mobile phone by an individual who moves away from the communication environment in the community. Moreover, Beliaeva *et al*. (2019) investigated that the dynamics of digital entrepreneurship and the innovation ecosystem. The found that defined digital entrepreneurship refers to creating new ventures and transforming existing businesses by developing novel digital technologies and/or novel usage of such technologies. In addition, Nambisan (2017) analyzed that the digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. The study showed that the digital environment in which businesses are operating, there is complexity and uncertainty in the market environment, meaning that there are threats as well as opportunities arising from digitalisation, not only during start-up but throughout a firm's lifecycle., it has been suggested that conventional entrepreneurship frameworks may be of limited value for exploring complex research enquiries around the dynamic interactions between entrepreneurship and digital technologies.

In the context of Nepal, Chandra and Kumar (2018) explored that the factors influencing organizational adoption of augmented reality in e-commerce: Empirical analysis using technology-organization-environment model. The study described that the organizational adoption of AR for e-commerce will bring out important factors organizations should focus on while considering the implementation of AR technologies to enhance the shopping experience of their consumers. Similarly, Kumar *et al*. (2012) analyzed that the artificial intelligence in education: Current trends and future prospects. The study found that security in the context of internet banking, as sensed by the users, prepares the foundation for the institutional trust paving the path of internet banking use. Likewise, Sharma and Kim

(2016) examined that the information communication technology development in Nepal. The study stated that the information communication technology status of Nepal in comparison with the overall information communication technology status of the world. Further, Dhakal *et al.* (2023) investigated that the institutional perception of e-recruitment adoption in Nepal: Evidence from structural equation modelling. The study showed that the institutional perception of e recruitment adoption in Kathmandu valley, Nepal by employing the notion of Technology Acceptance Model (TAM) and Self-Disclosure Theory (SDT). Moreover, Singh *et al*. (2022) explored that the role of bigdata and predictive analytics in HRM. The study observed that the significant role of Big Data and predictive analytics in improving the employee retention in the organisation.

The above discussion reveals that the empirical evidence vary greatly across the studies concerning the factor affecting technology advancement in digital age and technology advancement. 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 objective of the study is to analyze the factors that affect technology advancement in digital age in Nepal. Specifically, it examines the effect of decision making, online/distance education, technological innovation, communication and economic growth on technology advancement in digital age.

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 sources of data which were gathered from 24 different districts of Nepal. For primary data a structured questionnaire was used. This study contains a sample of 24 districts of Nepal whose respective data are collected from a total of 166 respondents. The respondents' views were collected on decision making, online/distance education, technological innovation, communication, economic growth and technology advancement in digital age. This study is based on descriptive as well as casual comparative research designs.

The model

The model used in this study assumes that technology advancement in digital age depends upon various factors. The dependent variable selected for the study is technology advancement in digital age. Similarly, the independent variables are decision making, online/distance education, technological innovation, communication and economic growth. Therefore, the model estimated in this study is stated as follows:

$$TA= \beta_0 + \beta_1 DM + \beta_2 OD+ \beta_3 TI+ \beta_4 C + \beta_5 EG +e$$

Where,

TA= Technology advancement in digital age

DM= Decision making

OD= Online/distance education

TI= Technological innovation

C= Communication

EG= Economic growth

Technology advancement in digital age was measured using a 5-point Likert scale where 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 "Mobile technology has increased access to information for rural communities", "Access to the internet has improved educational opportunities in Nepal" and so on. The reliability of the feature was measured by computing the Cronbach's alpha (α =0.829).

Decision Making was measured using a 5-point Likert scale where 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 "Government policies in Nepal effectively promote technological innovation", "Educational institutions in Nepal adequately prepare students for careers in technology", and so on. The reliability of the feature was measured by computing the Cronbach's alpha (α =0.821).

Online/Distance education 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 "The use of technology in online education has enhanced the quality of learning experiences", "Online education has made learning more flexible and accessible for working professionals" and so on. The reliability of the feature was measured by computing the Cronbach's alpha (α =0.852).

Technological Innovation were 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 "Technological innovation has significantly improved the efficiency of local businesses in Nepal", "The use of technology in agriculture has improved productivity for farmers" and so on. The reliability of the feature was measured by computing the Cronbach's alpha (α =0.849).

Communication 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 "The exchange of ideas through communication networks drives technological development", "Communication influences public perception and acceptance of new technologies" and so on. The reliability of the feature was measured by computing the Cronbach's alpha (α =0.851).

Economic growth 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 "Economic growth leads to greater consumer demand for technology products and services", "Economic growth enhances the ability of local firms to compete in the global tech market" and so on. The reliability of the feature was measured by computing the Cronbach's alpha (α =0.879).

The following section describes the independent variables used in this study along

with the hypothesis formulation.

Decision making

In the digital age, decision-making is a driving force behind the acceleration or stagnation of technological advancements. Strategic, policy, ethical, consumer-driven, and organizational decisions all contribute to shaping the future of innovation, technology integration, and societal impact. The ethical and social implications of technological decisions also merit attention. Decisions regarding the ethical use of AI, the automation of jobs, and the equitable distribution of technology are central to debates in the digital age (Binns, 2018). Organizations adopting data-driven decision-making can leverage insights from big data to enhance innovation and efficiency (Mcafee *et al.,* 2012). These advancements, in turn, have impacted industries ranging from healthcare to finance, accelerating the adoption of digital solutions and reshaping existing business models (Sierzchula *et al*., 2014). Similarly, Smith and Taylor (2023) stated that decision making significantly impact on Consumer preferences in determining technologies succeed in the marketplace. In the context of consumers, decision-making plays a role in determining which technologies become mainstream and achieve widespread adoption. Based on it, this study develops following hypothesis:

H_1: There is a positive relationship between decision making and technology advancement in digital age.

Online/distance education

Online or distance education refers to a mode of learning where students receive instruction and complete coursework remotely, using digital platforms and technology. This form of education eliminates the need for physical attendance in a traditional classroom, allowing learners to study from any location with internet access. Cavallo *et al.* (2021) revealed that the digital education has significant and positive influenced the global workforce of digital literacy and technical skills that are essential in the 21st century. The adoption of AI-powered tools for personalized learning has accelerated developments in machine learning algorithms that are widely applicable beyond education, including in healthcare and business sectors (Kumar, 2021). Furthermore, advancements in VR and augmented reality (AR) have opened new possibilities for immersive learning experiences, making education more interactive and engaging (Mikropoulos and Natsis, 2011). Based on it, this study develops following hypothesis:

H_2: There is a positive relationship between online/distance education and technology advancement in digital age.

Technological innovation

Technological innovation refers to the creation, development, and application of new technologies that solve problems or improve existing processes. The rise of cloud-based services has driven innovation by providing on-demand access to computing resources, thus enabling scalability, flexibility, and cost-efficiency (Armbrust *et al*., 2010). IoT sensors in manufacturing plants enable predictive maintenance, reducing downtime and increasing productivity (Lee *et al*., 2015). West (2016) emphasizes how these technologies are central to the creation of innovation ecosystems that allow businesses to collaborate and share knowledge across borders, fostering a global economy that is more interconnected and

efficient. McKinsey and Company (2017) highlights that automation and AI are expected to transform both labor markets and productivity, resulting in new business opportunities and job creation in fields like data science and AI ethics. Based on it, this study develops following hypothesis:

H_3: There is a positive relationship between technological innovation and technology advancement in digital age.

Communication

Communication serves as a vital catalyst for innovation by enabling the exchange of ideas, feedback, and knowledge. Researchers can communicate across borders, access a wealth of information, and collaborate on projects without the constraints of geography (Chui *et al.,* 2018). Kaplan and Haenlein (2010) showed that the positive and direct social media two-way communication between companies and customers, accelerating the feedback loop and improving the adoption of new technologies. According to Castells (2010), the network society facilitates rapid information flow, which accelerates the diffusion of technological innovations. Based on it, this study develops following hypothesis:

H_4: There is a positive relationship between communication and technology advancement in digital age.

Economic growth

Economic growth has played a crucial role in driving technical advancements in the digital age. According to Coyle (2016), digital platforms like Uber, Airbnb, and Alibaba have revolutionized industries by creating decentralized markets, increasing economic efficiency, and expanding economic opportunities on a global scale. Similarly, Lee (2017) revealed that the digital economy enables small and medium-sized enterprises (SMEs) which has increased global economic activity and growth. Likewise, Frey and Osborne (2017) stated that the digital economy is leading to the creation of high-skill jobs in sectors such as software development, data analysis, and robotics, which contributes to higher wages and more competitive economies. Based on it, this study develops following hypothesis:

H_5: There is a positive relationship between economic growth and technology advancement in digital age.

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 variable and independent variables. The correlation coefficients are based on 166 observations. The dependent variable is TA (Technology advancement in digital age). The independent variables DM (Decision making), OD (Online/distance education), TI (Technological innovation), C (Communication) and EG (Economic growth).

Variables	Mean	S. D	DM	OD	TI	C	EG	TA
DM	3.38	0.7864	1					
OD	3.571	0.8216	0.462**	1				
TI	3.548	0.7918	0.491**	0.541**	1			
C	3.517	0.7988	0.514**	0.510**	0.527**	1		
EG	3.516	0.8178	0.0492**	0.465**	0.514**	0.553**	1	
TA	3.419	0.7946	0.515**	0.485**	0.512**	0.542**	0.419**	1

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

Table 1 shows the Kendall's Tau correlation coefficients of dependent and independent variables. The study shows that decision making is positively correlated to technology advancement in digital age. It means that better decision making leads to increase in technology advancement in digital age. Similarly, there is a positive relationship between online/distance education with technology advancement in digital age. It means that more the online/distance education, higher would be the technology advancement in digital age. Likewise, technological innovation has a positive relationship with technology advancement in digital age. It shows that increase in technological innovation leads to increase in technology advancement in digital age. Furthermore, there is a positive relationship between communication and technology advancement in digital age. It shows that effective communication leads to increase in technology advancement in digital age. Moreover, economic growth has also positive relationship with technology advancement in digital age. Moreover, economic growth has also positive relationship with leads to increase in technology. It means that increase in economic growth leads to increase in technology advancement in digital age.

Regression analysis

Having indicated the Kendall's Tau correlation coefficients, the regression analysis has been carried out and the results are presented in Table 2. More specifically, it presents the regression results of Decision making, online/distance education, Technological innovation, communication and economic growth on technology in digital age.

Table 2

Estimated regression results of decision making, online/distance education, technological innovation, communication and economic growth on technology advancement in digital age.

The results are based on 166 observations using linear regression model. The model is $TA = \beta_0 + \beta_1 (DM) + \beta_2 (OD) + \beta_3 (TI) + \beta_4 (C) + \beta_5 (EG) + e$, where the dependent variable is TA (Technology innovation in digital age). The independent variables are DM (Decision making), OD (Online/distance education), TI (Technological innovation), C (Communication) and EG (Economic growth)

Models	Intercepts	Regression coefficients of					Adj. R_bar2	SEE	F-value
		DM	OD	TI	C	EG			
1	0.956 (5.043) **	0.729 (13.341) **					0.518	0.5519	177.993
2	0.777 (4.361) **		0.74 (15.215)**				0.583	0.5132	231.491
3	0.557 (3.286) **			0.807 (17.307) **			0.644	0.4741	299.537
4	0.642 (3.377) **				0.79 (16.719) **		0.628	0.4846	279.533
5	1.035 (5.278) **					0.678 (12.481) **	0.484	0.5708	155.768
6	0.316 (1.827)	0.394 (6.649) **	0.496 (8.754) **				0.67	0.4566	168.348
7	0.162 (0.988)	0.249 (4.002) **	0.228 (4.315) **	0.391 (5.094) **			0.714	0.4252	138.057
8	0.121 (0.753)	0.163 (2.437) **	0.227 (3.339) **	0.301 (3.745) **	0.247 (3.059) **		0.728	0.4147	111.223

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. Technology advancement in digital age is the dependent variable.

Table 2 shows the beta coefficients for decision making are positive with technology advancement in digital age. It indicates that decision making has a positive impact on technological advancement in digital age. This finding is similar to the findings of Smith and Taylor (2023). Similarly, the beta coefficients for online/distance education are positive with technology advancement in digital age. It indicates that online/distance education has a positive impact on technology advancement in digital age. This finding is similar to the findings of the (Cavallo *et al*. 2021). Likewise, the beta coefficients for technological innovation are positive with technology advancement in digital age. It indicates that technological innovation has a positive impact on technology advancement in digital age. This finding is similar to the finding of (Lee *et al*., 2015). Further, the beta coefficients for communication are positive with technology advancement in digital age. It indicates that communication has a positive impact on technology advancement in digital age. This finding is consistent with the findings of Castells (2010). Moreover, the beta coefficients for economic growth are positive with technology advancement in digital age. It indicates that economic growth has a positive impact on technology advancement in digital age. This finding is similar to the finding of (Lee, 2017).

4. Summary and conclusion

Technology advancement in the digital age refers to the rapid development and application of new digital technologies that enhance the way we live, work, and interact. It encompasses innovations in areas such as artificial intelligence (AI), machine learning, cloud computing, the Internet of Things (IoT), blockchain, big data, and digital communication platforms. Technology advancement in Nepal's digital age is shaped by a combination of infrastructure, education, government support, investment availability, and cultural attitudes. While Nepal has made significant strides in some areas, challenges such as limited access to advanced digital tools in rural areas, lack of skilled manpower, and infrastructure gaps remain.

However, continued focus on improving digital literacy, enhancing infrastructure, fostering entrepreneurship, and implementing supportive policies could accelerate technological advancement and bring Nepal closer to a fully digitized economy.

This study provides insightful information regarding the factors affecting technology advancement in digital age in Nepal. The study analyzes various significant variables that could impact technology advancement in digital age in Nepal. These variables include decision making, online/ distance education, technological innovation, communication and economic growth influence technology advancement in digital age in Nepal.

This study attempts to examine the factors affecting technology advancement in digital age in Nepal. The study is based on primary data with 166 observations.

The major conclusion of the study is that decision making, online/distance education, technological innovation, communication and economic growth have a positive impact on technology advancement in digital age. The study also concludes that technological innovation is the most significant factor followed by communication and online/ distance education that explain the factors affecting technology advancement in digital age in Nepal.

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