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"Bridging the Gap: Analyzing the Impact of Digital Divide on E-Governance in Rural Sudurpashchim Province, Nepal"

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Abstract: E-governance, alternatively referred to as digital governance, encompasses the provision of public services by means of information and communication technology (ICT) that facilitates the exchange of ICT between governmental entities and the general public. The public is provided with access to government services that are efficient, transparent, and transparent by means of e-governance. To investigate the potential consequences of the digital divide on the implementation of e-governance in Sudurpaschim Province, Nepal, a comprehensive survey was conducted among a diverse sample of residents to identify demographic factors that significantly impact the use of e-governance services. The results of the study indicate that factors such as age, income, education, and internet utilisation frequency significantly influence the adoption of e-governance services. The research investigates the ramifications of these discoveries and suggests avenues for further investigation in this field.

Keywords E-Governance, Digital Divide , ICT Accessibility , Digital Literacy , E- Participation , Regional Disparities.

Background

Digital governance, also known as e-governance, concerns itself with the utilisation of information and communication technology (ICT) to streamline service delivery and public-government interactions. By means of e-governance, government services are rendered accessible, transparent, and efficient to the public. By utilising the most cutting-edge ICTs via an electronic network, e-government enables governments to provide public services and information more conveniently. In addition to transparency, enhanced services, and increased efficiency, e-governance offers several other significant advantages. Effective e-governance requires a significant enhancement of regulatory and policy-making capabilities, given the opinion-forming processes and requisite knowledge involved.

"The increasing role of e-government in promoting inclusive and participatory development has gone hand-in-hand with the growing demands for transparency and accountability in all regions of the world" (United Nations, 2012).

1. Introduction

Heeks (2008) presents an opposing viewpoint to the notion that e-governance should be limited to Internet-based applications, which some contend are essential components of e-governance. Beyond government, e-governance enables electronic constituent participation in political activities, including e-voting, e-democracy, and electronic participation in political activities. Therefore, the notion of e-governance will encompass the functions of the judiciary, political parties and organisations, the government, and public participation. Consequently, e-participation and e-governance represent pivotal phases in the progression of digital or online governmental procedures.

Pulliam projects that by 2009, agency expenditures on e-government initiatives will increase by 6.9 % annually, reaching $5.8 billion. From 2004 to 2009, the projected expenditure of Defence Department agencies on e-government initiatives increased from $115 million to $152 million. It is expected that expenditures by civilian agencies will escalate from $86 million in 2004 to $114 million in 2009.

E-Governance In Nepal

Nepal, formally recognised as the Federal Democratic Republic of Nepal, is defined by its location along the Tibetan Autonomous Region of China and the Indian subcontinent. According to the 2011 census, the population of this nation was approximately Twenty-seven million (Central Bureau of Statistics, 2014). It is difficult for the nation to develop and maintain an economy. The World Bank classifies more than twenty-five percent of the population of Nepal as indigent (Uematsu et al., 2016). The 2015-promulgated new constitution of the nation is presently undergoing implementation, entailing significant alterations to the governance framework (Lawoti, 2003; 'President promulgates Constitution of Nepal', 2015; United Nations, 2006; Upreti, 2006).

Respectably, Nepal has embraced the application of technology. In 1971, Nepal implemented its inaugural computer system for the purpose of conducting the census (Bhattarai and Gupta, 2008). The nation had initially formulated its IT policy in the year 2000 (HLCIT Nepal, 2010; 'IT Policy 2000', 2000). Nepal has witnessed significant advancements in its wireless communication infrastructure, as evidenced by the nationwide availability of mobile telephones in all 75 districts and the advent of the 4G LTE network in January 2017('Nepal Telecom launches 4G service', 2017).

In Kathmandu, the capital, initiatives like electronic tax filing and online land registries showcase potential (Sharma et al., 2016). Additionally, the city boasts improved internet connectivity and a tech-savvy population, leading to higher e-service adoption rates . However, these advancements struggle to translate seamlessly to rural regions (Giri et al., 2018). In provinces like Sudurpashchim, poor infrastructure, limited digital literacy, and language barriers create a significant digital divide, hampering access to crucial e-governance services . This discrepancy hinders equal participation in public services and perpetuates socio-economic inequalities (Bhattarai, 2021). Bridging this gap requires context-specific interventions, like mobile-based platforms and vernacular language interfaces, alongside rural infrastructure development and digital literacy campaigns (Jha, 2016). Only by addressing these disparities can Nepal truly claim progress on its e-governance journey and ensure inclusivity for all citizens.

Digital Divide In Sudurpaschim Province, Nepal

The digital divide is particularly pronounced in rural areas, where limited infrastructure, lower literacy rates, and financial constraints often hinder access to ICTs. This disparity can have a significant impact on e-governance initiatives in rural contexts, as it can exclude large portions of the population from accessing essential public services and participating in democratic processes (Heeks, 2002). The digital divide remains an enduring obstacle in numerous developing nations, Nepal being no exception. This pertains to the disparity that is present between individuals who have access to information and communication technologies (ICTs) and those who do not. Sudurpaschim Province, one of the most isolated and underdeveloped areas in Nepal, demonstrates a significant digital divide (Sharma et al., 2018). E-governance, the use of ICTs to improve the delivery of public services, and citizen engagement are all profoundly affected.

According to the Nepal Telecommunications Authority (NTA), only 32.4% of households in Sudurpaschim Province have internet access, compared to the national average of 45.7% (NTA, 2022). This disparity is even wider in rural areas, where internet penetration rates are as low as 10% (Koirala et al., 2020). Furthermore, access to ICTs is often limited to basic mobile phone services, with few households having access to computers or broadband internet (Sharma et al., 2018).

E-Government Consequences: The Digital Divide

Digital divide affects e-governance and its outcomes. The exclusion of a significant portion of the populace from e-governance services contributes to an inequitable distribution of services and sustains social disparities. Due to the digital divide, citizen participation is constrained, reducing governance openness and accountability.

The digital divide limits citizen participation in e-governance initiatives. Online consultations, public hearings, and other forms of e-participation are often inaccessible to people without access to ICTs or digital literacy skills. As a result, marginalised groups may be excluded from participation in government decision-making processes, which may exacerbate feelings of estrangement (Heeks, 2002). E-governance initiatives in

Sudurpaschim Province are profoundly impacted by the digital divide. A significant portion of the populace is unable to utilise e-governance services, including online grievance redress mechanisms, social security payments, and tax filing, due to their lack of access to ICTs. This can lead to frustration and dissatisfaction among citizens, and it can also hinder the government's ability to deliver effective public services.

Digital literacy education is essential to enable citizens to effectively utilize ICTs and engage with e-governance platforms. Basic computer training, teaching online service navigation, and raising awareness of ICT benefits are key components of digital literacy programs.

The primary aim of this research is to determine the impact of the digital divide on electronic governance in the rural region of Sudurpashchim Province, Nepal. The study will examine the comprehensive ramifications of the digital divide on all aspects of governance, including citizen participation, availability of e-governance services, and overall results. The research will furnish policymakers and practitioners with invaluable insights as they strive to reconcile the digital divide and advance inclusive e-governance in Nepal.

2. Literature Review

2.1 E-governance implementation:

Adams et al.(2023) explored the relationship between the United Nations (UN) e-government index (EGDI) and e-government development in Africa from 2010 to 2020 and forecasted the effect of e-government on the actualization of the sustainable development goals (SDGs) in Africa by 2030. To achieve the objectives, the researchers collected secondary data on EDGI, online service delivery index (OSI), telecommunication infrastructure index (TII), and human capital index (HCI) from the UN e-government survey spanning 2010-2020. The study utilized an improved modeled technique of panel data regression for cross-sectional observations. The findings indicated that there existed a positive and significant impact of the OSI, TII, and HCI on the overall EGDI in Africa. The study also revealed that there was a strong and positive relationship between E-government Development Indicators and the achievement of UN SDGs in Africa. This implied that African nations would experience a slow and insignificant increase from 2022 with an EGDI value of 0.4208 to 0.4331 in 2024, implying a 2.9% slight increment. The predicted value further showed that there would be a decrease from the EGDI value of 0.4331 in 2024 to 0.4330 in 2026, while the average EGDI value would increase slightly to 0.4346 in 2028 and finally to 0.4369 in the year 2030, which was equivalent to a 0.5% increment. The EGDI value obtained predicted that Africa may not attain UN SDGs by 2030. Accordingly, the study recommended that drastic measures be taken to improve the three indices (Adams & Paul, 2023).

Malodia et al.(2021) investigated the significant disruptions caused by the information and hyper-connectivity revolutions in citizens' interactions with governments worldwide. Failures in implementing e-government interventions suggested a lack of an integrated approach in understanding e-government as a discipline. In their study, an overarching and integrated conceptual framework of e-government, grounded in robust qualitative research, was presented to describe the factors that needed integration for successful e-government implementation. Drawing insights from 168 in-depth interviews conducted with multiple stakeholders in India, the study defined e-government as a multidimensional construct with antecedents in customer orientation, channel orientation, and technology orientation. Building on customer orientation and relationship marketing theories, the study proposed that the most significant factor impacting the success of e-government projects was citizen orientation, followed by channel orientation and technology orientation. The study also identified the digital divide, economic growth, and political stability as moderators of e-government. Furthermore, the study proposed the tangible and intangible outcomes of e-government, with perceived privacy and shared understanding as moderating conditions. Finally, the study presented relevant theoretical and practical implications with future research directions.

Mensah et al.(2020) proposed and validated an extension of the unified model of electronic government adoption (UMEGA). Contrary to expectations, the results demonstrated that performance expectancy, effort expectancy, and social influence did not predict the attitude toward the use of e-government services. Facilitating conditions were found to significantly determine both the behavioral intention to use and effort expectancy of e-government services. Perceived service quality and trust in government were found to positively predict the intention to use and recommend the adoption of e-government services.

Twizeyimana and Andersson et al.(2019) organized existing research on the public value of e-government to investigate the current state and what value e-government is supposed to yield. Six values were identified: Improved public services, improved administrative efficiency, Open Government (OG) capabilities, improved ethical behavior and professionalism, improved trust and confidence in government, and improved social value and well-being. These dimensions were generalized into three overarching public value dimensions of Improved Public Services, Improved Administration, and Improved Social Value. The literature study theorized a descriptive and multidimensional framework that improves understanding of the public value of e-government and highlights research gaps.

Rahman et al.(2021) aimed to conduct a comprehensive analysis of various theories built around e-governance perception, with a focus on the penetration of e-government systems at the grassroots. The research specifically focused on e-government implementations at the grassroots that penetrated the lowest tier of the governance system for community empowerment and knowledge enhancement. The study proposed a framework for future e-government systems at the local government level and suggested a prospective research agenda.

Islam et al.(2021) examined the existing level of e-governance in Bangladesh and identified obstacles to enhancing public service delivery and citizen involvement. The study found that e-governance measures in Bangladesh, such as online service delivery and procurement, helped reduce corruption. However, considerable obstacles still existed, including a lack of infrastructure, residents with inadequate knowledge and expertise, and public authorities with insufficient resources. The research also found prospects for e-governance to boost citizen involvement, enhance transparency and accountability, and expand access to public services .

Kuzior et al.(2023) conducted a study on smart cities, a complex concept analyzed from various aspects. E-governance was identified as a key facilitator for integrating all elements of a smart city. The article aimed to investigate key enablers of e-governance, focusing on economic, social, political, information, and technological indicators. The research included 68 smart cities selected based on different regional affiliations and diverse economic, social, and political developments. The authors utilized cluster analysis to categorize smart cities into clusters according to e-governance indicators. They constructed an integral indicator using a linear mathematical model and the Fishburn formula, employing VAR/VEC modeling to study key factors influencing e-government development in smart cities. The study found that the Human Development Index had the greatest impact on e-governance, while the GNI per capita indicator showed no influence across all clusters. The factor of information technologies was identified as the main direct influence on the Smart City Governance Index for smart cities in the first cluster with the highest e-governance indicators.

Pandey et al.(2020) conducted a study on collaboration competency and e-governance performance. While collaboration is extensively practiced and researched in the corporate sector, limited research has been carried out in the context of e-governance. Experiences from the relatively modest success of e-governance initiatives in India and other developing countries point to a lack of strategic collaboration within and across government organizations. The study revealed that e-governance users desire their concerns to be addressed, while implementers of e-governance projects struggle with inter- and intra-organizational collaborations. The National e-Governance Plan (NeGP), 2006, and its subsequent version, NeGP 2.0, a component of the Digital India program by the Government of India, have emphasized collaboration to unleash the full potential of e-governance. The paper explored the role of collaboration competency in the context of a public organization through a study of an e-governance project, shedding light on the potential linkage of collaboration competency with e-governance performance.

Naqvi et al.(2023) conducted a study to investigate the role of e-governance during the COVID-19 catastrophe in the context of economic performance. The research employed descriptive trend analysis, collecting data from reports, statistics, and rankings developed by the United Nations, along with big data implications during Covid-19. The study focused on comparing and analyzing the effects of e-governance on pandemic control and economic performance. It highlighted the declining trend in the country's ranking of e-government development indicators (EGDI) from a score of 137 to 148. However, e-governance implications, including internet performance, 4G, and big data technology, played a significant role in controlling the pandemic. The study concluded that e-governance plays a positive role in combating pandemics and is crucial for achieving sustained economic growth. The researchers suggested that Pakistan should learn from the

experiences of developed countries that have successfully adopted e-governance tools and technological advancements. Implementing these efforts can help combat catastrophes and ensure the country's sustainable economic performance.

2.2 Digital Divide

Afzal et al.(2023) conducted a study to investigate the impact of the digital divide on students' access to technology and its influence on their educational outcomes. Utilizing a quantitative research methodology, the researchers gathered data from a sample size of 400 students with diverse educational backgrounds. Survey questionnaires were employed to collect information on internet access, device ownership, and technology use in education. The findings revealed variations in internet access across different age groups, with younger individuals having higher levels of access than older age groups. Disparities in household internet access were observed between rural and urban areas, with rural areas experiencing lower connectivity. Gender-based differences in personal device ownership were also evident, highlighting potential gender-related digital divides. Furthermore, students from low-income households faced lower levels of internet access, indicating a socioeconomic divide in technology access. The study emphasized the importance of establishing technology resource centers in schools and fostering public-private partnerships to bridge the technology gap in education. Overall, the research contributes to the existing body of knowledge by providing insights into the digital divide and offering recommendations for addressing this issue in the field of education.

Pérez-Morote et al. (2020) conducted a study analyzing panel data from 27 European countries spanning the period 2010 to 2018. The research confirmed that citizens' use of e-government services is influenced by supply-side e-government evaluations, citizens' trust in governments, and the digital divide associated with income and education. Longitudinal cluster analysis identified patterns of behavior between countries regarding the interaction of these variables with the use of e-government services over time. The study's findings have relevant practical implications that can guide public policy in the area of e-government.

Zhao et al.(2021) conducted a systematic literature review on digital competence in higher education settings. Utilizing Web of Science and Scopus databases, the review analyzed existing research from 2015 to 2021. The review aimed to provide the scholarly community with a current overview of digital competence research, covering the definition of digital competence, dimensions used for evaluation, research purposes, methodologies, results, and limitations. Major findings included the majority of publications citing both research and EU policy in defining digital competence. The review indicated that most university students and teachers have a basic level of digital competence. Institutions of higher education were encouraged to focus on developing students' and teachers' digital competence, create relevant learning strategies, and use appropriate tools to improve the quality of education.

2.3 Digital Divide In Relation With E -Governance

Botrić et al.(2021) conducted a study exploring the recent evolution of the digital divide in Europe using Eurostat's Community Statistics on Information Society (CSIS) microdata from 2008–2017. The research analyzed the difference in e-governance adoption between younger and older internet users, investigating their reasons for not using e-government services. Heckman selection methodology identified factors that determined the difference in reluctance to adopt e-governance services between senior citizens and the young. The study recommended EU-wide policy actions, emphasizing special attention to older populations in sparsely populated areas and developing specialized learning activities for older citizens, with additional efforts to promote inclusion of older women in these activities.

Alqahtani et al. (2021) conducted a study exploring the relationship between technology adoption and cybersecurity compliance. The research aimed to provide practical implications to technology developers and policymakers while identifying factors affecting cybersecurity compliance in organizations or home environments for general users, HR, IT administrators, engineers, and others. The study explored the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model, assessing the effect of its factors on cybersecurity compliance in organizations.

Molobela et al.(2023) conducted a study premised on the seventh paradigm of Public Administration as Governance. The research aimed to explore the paradigm shift brought about by e-Government and e-

Governance in the field of Public Administration during the Information Age. The study used a qualitative research methodology, reviewing literature from scholarly journal articles, academic books, trusted academic databases, and websites to establish solid arguments and generate empirical knowledge. The findings consistently revealed evidence of a paradigm shift towards e-Governance. However, there was simultaneously an absence of a complete transition towards e-Governance as the new paradigm of Public Administration. The study concluded that it remained unclear whether the paradigmatic shift towards e-Governance should be considered an empirical claim or a normative proclamation.

Terrance et al. (2023) endeavored to assess the e-readiness of South African municipalities for the implementation of e-government services. The study aimed to evaluate the impact of e-readiness on e-government implementation, focusing on enhancing e-participation platforms and providing access to e-services in municipalities. The researcher developed an e-readiness theory to contextualize the associated problem statement with e-government implementation. Employing a qualitative research method, the study heavily relied on secondary data. A data cleaning strategy was employed to ensure the accuracy and relevance of the data through doctrinal examination, avoiding potential errors and irrelevant data presentation. The e-readiness of four municipalities was reviewed and assessed, with a focus on their commitment to implementing e-government services. Descriptive data analysis compared secondary data from scholarly journals, books, credible websites, municipal digital plans, and peer-reviewed databases to support existing claims. The findings indicated a high rate of e-government implementation failure due to a shortage of Information Communication Technology (ICT) specialists. Additionally, inadequate funds for maintaining ICT infrastructure appeared to impede successful e-government progress in the selected municipalities. The study concluded that transformation agendas and policies on e-government lacked direction in providing necessary ICT infrastructure. As a result, the study suggested the adoption of e-government programs and the sufficient use of ICT strategies as tools to improve e-participation and deliver more valuable e-services. The study made a significant contribution to the assessment of e-readiness policies, aiming for successful e-government implementation within municipalities.

Marino et al. (2023) aimed to assess the spread of eGovernment in the European Union. The research considered indicators such as ICT's Usage, Digital Public Services, Connectivity, Online Service Index, Telecommunication Infrastructure Index, Digital Skills, and Gini Coefficient for ranking European countries. The comparative study revealed that the digital divide persisted despite infrastructure investments and increased access to information. Countries with less efficient eGovernment systems and lower adaptability to digital technology were at risk of accumulating delays in adopting eGovernment services. The paradoxical outcome suggested a potential widening of existing gaps instead of leveraging digital technologies to reduce disparities through greater system efficiency.

Pontones-Rosa et al.(2023) aimed to ascertain the level of e-government implementation in rural municipalities of depopulated Spain and reflect on its potential influence on citizens' intention to emigrate. The study focused on the Province of Albacete, known for its deployment of digital services, and measured e-government supply development through municipal indexes constructed via website content analysis. Additionally, using regression analysis, the research assessed the demand and actual use of e-government by rural inhabitants based on survey data collected by the authors. The results indicated deficient e-information and e-participation in small municipalities, highlighting a digital divide by municipal size. On the demand side, the findings emphasized the need to promote greater e-government use and enhance digital inclusion across all population segments.

Table 1. Comparison table

Author(s)	Year	Summary	Findings
Adams et al.	2023	Explored the relationship between UN EGDI and e-government development in Africa, forecasting the impact on achieving UN SDGs by 2030.	Positive impact of OSI, TII, and HCI on EGDI; Positive relationship between E-government Development Indicators and UN SDGs; Slow increase in EGDI from 2022 to 2030, implying Africa may not attain UN SDGs by 2030.

Malodia et al.	2021	Presented an integrated conceptual framework of e-government based on qualitative research in India. Emphasized citizen orientation, channel orientation, and technology orientation as crucial factors.	Identified citizen orientation as the most significant factor impacting e-government project success. Proposed tangible and intangible outcomes of e-government. Recognized digital divide, economic growth, and political stability as moderators.
Mensah et al.	2020	Validated an extension of UMEGA, finding that facilitating conditions significantly determine e-government adoption. Perceived service quality and trust in government positively predict intention to use e-government services.	Performance expectancy, effort expectancy, and social influence did not predict attitude toward e-government use. Facilitating conditions significantly determine behavioral intention and effort expectancy. Trust in government and perceived service quality positively predict e-government adoption.
Twizeyimana and Andersson et al.	2019	Organized existing research on the public value of e-government, identifying six values and proposing a descriptive and multidimensional framework.	Identified public value dimensions: Improved Public Services, Improved Administration, and Improved Social Value. Highlighted research gaps.
Rahman et al.	2021	Analyzed various theories around e-governance perception, focusing on grassroots e-government implementations. Proposed a framework for future e-government systems at the local government level. Recommended a prospective research agenda.	Emphasized the need for comprehensive analysis of grassroots e-government implementations. Proposed a framework for future e-government systems at the local government level. Suggested a prospective research agenda.
Islam et al.	2021	Examined e-governance in Bangladesh, identifying obstacles and prospects for enhancing public service delivery and citizen involvement.	E-governance measures in Bangladesh reduced corruption. Obstacles included lack of infrastructure, inadequate knowledge, and insufficient resources. Identified prospects for citizen involvement, transparency, accountability, and expanded access to public services.
Kuzior et al.	2023	Investigated key enablers of e-governance in smart cities, utilizing cluster analysis to categorize cities and identifying factors influencing e-government development.	Human Development Index had the greatest impact on e-governance. GNI per capita showed no influence. Information technologies were the main direct influence on the Smart City Governance Index.
Pandey et al.	2020	Explored collaboration competency and e-governance performance in a public organization context, highlighting the importance of collaboration.	Collaboration competency is crucial for addressing e-governance users' concerns and improving e-governance performance.
Naqvi et al.	2023	Investigated the role of e-governance during the COVID-19 catastrophe in economic performance, emphasizing e-governance implications in pandemic control.	E-governance played a positive role in controlling the pandemic and was crucial for sustained economic growth. Pakistan should learn from successful e-governance

			implementations in developed countries.
Afzal et al.	2023	Explored the impact of the digital divide on students' access to technology and its influence on educational outcomes, highlighting disparities based on age, location, and socioeconomic factors.	Variations in internet access across age groups. Disparities in household internet access between rural and urban areas. Gender-based differences in personal device ownership. Students from low-income households faced lower internet access. Recommendations to address these divides.
Pérez-Morote et al.	2020	Analyzed panel data from 27 European countries, confirming factors influencing citizens' use of e-government services. Identified patterns over time and recommended policy actions.	Factors influencing e-government use: supply-side evaluations, citizens' trust, and digital divide based on income and education. Longitudinal analysis identified patterns over time. Recommended EU-wide policy actions.
Zhao et al.	2021	Conducted a systematic literature review on digital competence in higher education settings, providing an overview of research from 2015 to 2021.	Majority of students and teachers have basic digital competence. Institutions should focus on developing digital competence, creating relevant learning strategies, and using appropriate tools.
Botrić et al.	2021	Explored the digital divide in Europe, analyzing Eurostat's CSIS microdata from 2008–2017. Identified factors influencing e-governance adoption and recommended EU-wide policy actions.	Digital divide factors: age, gender, household size, population density, economic activity, and education. Recommended EU-wide actions, focusing on older populations in sparsely populated areas and promoting inclusion of older women.
Alqahtani et al.	2021	Investigated the relationship between technology adoption and cybersecurity compliance, exploring the UTAUT2 model. Provided practical implications for technology developers and policymakers.	UTAUT2 factors (performance expectancy, effort expectancy, social influence) did not predict attitude toward e-government use. Facilitating conditions determined behavioral intention and effort expectancy. Trust in government and perceived service quality positively predicted e-government adoption.
Molobela et al.	2023	Explored the paradigm shift brought about by e-Government and e-Governance in Public Administration during the Information Age. Found evidence of a shift towards e-Governance, but an absence of a complete transition.	Evidence of a paradigm shift towards e-Governance in Public Administration. Unclear whether the shift should be considered empirical or normative.
Terrance et al.	2023	Assessed the e-readiness of South African municipalities for e-government implementation. Found a high rate of e-government implementation failure due to a shortage of ICT specialists and	E-government implementation failure due to ICT specialist shortage and inadequate funds. Transformation agendas and policies on e-government lack direction in providing necessary

		inadequate funds.	ICT infrastructure.
Marino et al.	2023	Assessed the spread of eGovernment in the European Union, considering indicators like ICT's Usage, Digital Public Services, Connectivity, and Digital Skills.	Despite investments, a digital divide persisted. Countries with less efficient eGovernment systems risked delays in adopting eGovernment services.
Pontones-Rosa et al.	2023	Ascertained the level of e-government implementation in rural municipalities of depopulated Spain. Identified deficient e-information and e-participation in small municipalities, emphasizing the need for greater e-government use and digital inclusion.	Deficient e-information and e-participation in small municipalities, indicating a digital divide. Emphasized the need for greater e-government use and digital inclusion.

Research Framework: The research model and a summary of the hypotheses examined in the study are illustrated in Figure 3.1.

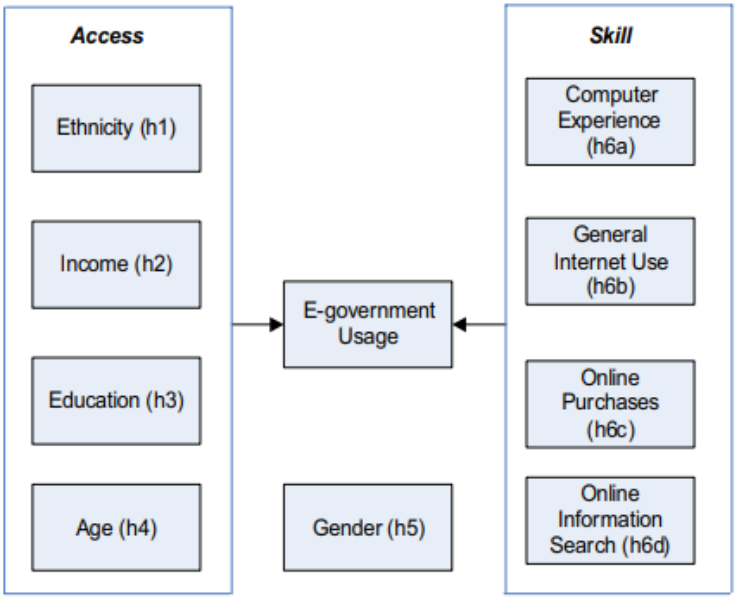

Figure 3.1: Usage of E-governance and the Digital Divide

3. Materials And Methods

3.1 Overview

To examine the hypotheses with the utmost realism, the study employed a multifaceted survey methodology encompassing a diverse range of Sudurpaschim Province citizens. The survey instrument underwent a thorough pre-testing phase, initially administered to undergraduate students for pilot testing purposes. After undergoing refinement and validation, the survey was disseminated during a community event to a more extensive sample of citizens. The survey data were subjected to statistical analysis, which entailed the application of chi-square test statistics and one way ANOVAs to identify significant findings and establish dependable conclusions.

3.2 Instrument Development

To assess the perception and utilization of e-governance services in Sudurpaschim Province, Nepal, a survey was conducted with two versions. In light of the widespread adoption of online tax filing and licence renewals, inquiries were posed to participants regarding these two services, which are provided by the Department of Transport Management and the Department of Inland Revenue, respectively. Questions and instructions were tailored to the specific survey version received by each respondent. The selection of these two agencies was considered crucial for enhancing the generalizability of the survey findings while providing respondents with familiar reference points for their responses.

A pre-testing phase was conducted involving a review of potential ambiguities in the wording and subsequent revisions. Subsequently, a pilot test was administered to a sample of 136 undergraduate students from a prominent university in Sudurpaschim Province, Nepal.

3.3 Sample

In order to collect the necessary data, a survey was distributed to 106 individuals who attended a community-wide concert coordinated by the Madan Puraskar Guthi in a rural district of Sudurpaschim Province, Nepal. The sample was diverse. 105 of the distributed surveys were finished and considered suitable for analysis. The age distribution of the participants in the sample was from 15 to 80 years, with an average age of 31 years. Around 39% of the participants in the sample self-identified as male. In terms of ethnicity, 56% of the participants were Madheshi, 26% were Janajati, and the remaining 18% preferred not to disclose their ethnicity.

96% of respondents had simple access to the internet, and 80% utilized it on a daily basis, according to the study. Every week, around 67% of subjects acquire knowledge through online sources. 61% of the subjects conduct fewer than one online purchase transaction per month. 83% of the surveyed subjects access government information via the internet, and 66% have completed government transactions online.
A summary of demographic data can be found in Table 3.1.

Table 3.1: Sample Demographics (n = 105)

Demographic	Minimum	Maximum	Mean
Age	15	80	31
No. of years of computer use	0	32	17
Number of years of full-time employment	0	47	7
Family Annual Income	< 10K*	>300K	25-86K

Gender	**Male**	39
	Female	66
Ethnicity	**Madheshi**	56
	Janjati	26
	Not available	18

Hypothesis:
Given the absence of prior research investigating this, we put forth the subsequent hypotheses:
Hypothesis 1(H1): Ethnicity will have a substantial effect on the utilisation of e-government services.
Hypothesis 2(H2): The level of income will have a substantial effect on the utilisation of e-government services.
Hypothesis 3(H3): The level of education will have a substantial influence on the utilisation of e-government services.
Hypothesis 4(H4): Age will have a substantial influence on the utilisation of e-government services.
Hypothesis 5(H5): Using of e-government services will be significantly impacted by gender.

Hypothesis 6a(H6a): An increased number of years of computer experience will result in a greater propensity to utilise e-government services.
Hypothesis 6b(H6b): Increased Internet usage frequency will result in increased adoption of e-government services.
Hypothesis 6c(H6c): Increased online purchasing frequency will result in increased utilisation of e-government services.
Hypothesis 6d(H6d): Increased frequency of online information searches will result in increased utilisation of e-government services.

3.4 Examining Data

As stated previously, two versions of the instrument were distributed at random (Department of Inland Revenue–DIR and Department of Transport Management–DTM); Around 50% of the participants finished one iteration, while the remaining 50% finished the other. To mitigate the potential bias introduced by respondent demographics towards a specific state government agency, chi-squared comparison tests were conducted. Based on the lack of significance observed in all Chi-squares, Based on the respondents' reports, Assuming that the two variations of the survey contained no statistically significant differences, the following can be deduced.

Two statistics were then employed to assess the influence of demographic dependent variables on substantive utilisation of e-government services. One-way ANOVA tests were utilised to analyse ratio data, while Chi-square tests were applied to analyse categorical and ordinal data. In light of the lack of significant variation observed among the samples, a sample size of 105 data points was aggregated for the objectives of these analyses.

4. Results

The findings derived from our analyses are displayed in Table 4.1.

Table 4.1. Hypothesis Testing Regarding E-government

Hypothesis	Test	Statistics	P -value	Supported
[H1] Ethnicity	Chi-square	245.113	0.889	NO
[H2] Income	Chi-square	174.974	.023	YES
[H3] Education	Chi-square	1368.626	.018	YES
[H4] Age	ANOVA	1.823	.018	YES
[H5] Gender	Chi-square	28.450	.778	YES
[H6a] Computer experience	ANOVA	1.067	0.524	NO
[H6b] Internet use	Chi-square	189.117	.000	YES
[H6c] Online purchases	Chi-square	130.299	.378	NO
[H6d] Online information search	Chi-square	178.863	.004	YES

The results of hypothesis testing, as outlined in Table 4.1, provide valuable insights into the factors influencing the utilization of e-government services in Sudurpaschim Province, Nepal. Firstly, the hypothesis [H1] examining the association between ethnicity and e-government utilization did not yield a significant result ($p = 0.889$), suggesting that ethnicity is not a determining factor in citizens' engagement with e-government services. Conversely, [H2] examining the relationship between income levels and e-government utilization produced a significant outcome ($p = 0.023$), indicating that income has a notable influence on citizens' participation in e-governance. Similarly, [H3] exploring the connection between education levels and e-

government utilization revealed a significant association (p = 0.018), emphasizing the impact of education on citizens' engagement with e-government services.

Moreover, [H4] investigating the correlation between age and e-government utilization yielded a significant result (p = 0.018), signifying that age plays a role in shaping citizens' interactions with e-governance. In contrast, [H5] assessing the association between gender and e-government utilization showed a non-significant result (p = 0.778), suggesting that gender does not significantly affect citizens' engagement with e-government services. Furthermore, [H6a] examining the influence of computer experience on e-government utilization did not produce a significant result (p = 0.524), indicating that citizens' familiarity with computers does not significantly impact their participation in e-governance. Conversely, [H6b] exploring the association between internet use and e-government utilization yielded a significant result (p = 0.000), highlighting the substantial influence of internet usage on citizens' engagement with e-governance. Additionally, [H6c] investigating the relationship between online purchases and e-government utilization did not result in a significant finding (p = 0.378), suggesting that online purchasing behavior is not significantly linked to citizens' participation in e-governance. Lastly, [H6d] examining the connection between online information search and e-government utilization produced a significant result (p = 0.004), underscoring the importance of online information-seeking behavior in citizens' engagement with e-government services.

It is evident that none of the three hypotheses (H1, H6a, and H6c) are supported. Noting this, the results that are not statistically significant for H5 do, in fact, support the hypothesis.

5. Discussion

Demographic factors, which have been recognised in academic literature as mediating the digital divide, were investigated in the present study in relation to e-government service utilisation.

Age, income, education, and monthly Internet usage all have a significant impact on the utilisation of e-government services, which is consistent with previous research.

E-government service users are more prevalent among the following demographic groups: Younger members of society, those with advanced degrees and greater financial means, and those who employ the Internet for supplementary intentions. This demonstrates beyond any reasonable doubt that the digital divide significantly affects e-government usage.

We found no significant predictive value for e-government use based on ethnicity, frequency of Internet purchasing, or computer experience, which contradicted our initial hypothesis. Given the frequent reference to ethnicity as a factor contributing to the digital divide, we anticipated that this hypothesis would be validated within our sample.

This result might be attributable to sample artefacts. We were composed primarily of Madheshi with 26% Janajati. 18%, however, opted not to disclose their ethnicity.

It is conceivable that a significant portion of the sample comprised members of a minority group who chose not to disclose their status, thus potentially influencing the findings. This paper contends that the digital divide poses a hindrance to e-government. Although our findings provide support for this, they also prompt us to consider the possibility that e-government may further exacerbate the digital divide. E-government signifies an additional technological advancement from which specific segments of the populace are precluded.

Barriers to the skills divide may arise, alongside access divide factors, due to the challenges faced by economically disadvantaged and elderly individuals in acquiring the requisite skills to utilize this medium effectively. It is crucial that the broader community actively participates in initiatives aimed at improving the educational capacities and capabilities of marginalised populations located at the minimum portion of the digital divide.

6. Limitations and Future Research

While this study endeavors to illuminate the intricate relationship in the digital divide and e-governance in Rural Sudurpashchim Province, Nepal, it is essential to acknowledge the inherent limitations that shape the contours of its findings. These limitations, integral to the research process, encompass factors ranging from the representativeness of the sample to potential biases in data collection methods. Some of the limitations are as follow:

1. The study's findings may not be entirely generalizable beyond Sudurpashchim Province due to the specific focus on this region, limiting broader applicability to other areas in Nepal.
2. The study's capacity to establish causal relationships between the observed digital divide and its influence on e-governance is constrained by its cross-sectional design, which offers only a momentary depiction and not a comprehensive chronology.
3. The study relies on self-reported data, which may be subject to limitations in the participants' awareness and understanding of digital access and e-governance. The accuracy of responses may be influenced by individual interpretations of technological terms.
4. Language and cultural diversity within Sudurpashchim Province may present challenges in survey responses and data interpretation. Subtle nuances in language or cultural contexts may impact the validity of findings.
5. The study may face limitations in terms of resources, potentially affecting the depth and scope of data collection. Constraints in funding and time may limit the ability to conduct more extensive fieldwork or include a broader range of participants.

This study unveils a spectrum of complexities inherent in the interplay between the digital divide and e-governance. Yet, the unveiling of one layer of understanding begets an inevitable call for further exploration. Future research endeavors hold the promise of untangling additional layers of nuance, investigating dynamic shifts in technology, and crafting innovative solutions to bridge the digital gap in this unique rural context. Employing a longitudinal study design will facilitate the tracking of the evolution of these implications over an extended period, providing a nuanced understanding of the changes and trends. Additionally, the research will involve conducting comparative studies across different provinces or regions in Nepal to discern variations in digital accessibility and analyze their specific impacts on E-governance. By exploring the policy implications of the digital divide on E-governance, the study aims to offer actionable insights for policymakers, enabling them to address challenges faced by diverse communities within Nepal effectively.

Delving into the socio-cultural nuances and contextual factors contributing to the digital divide will be a pivotal aspect of the research. This exploration is essential for uncovering the underlying causes and intricacies of the divide, paving the way for more targeted interventions to bridge the gap. Furthermore, the research will focus on investigating strategies for community engagement and participation in the development of E-governance initiatives. This approach aims to ensure a more inclusive and sustainable implementation of digital solutions, taking into account the unique needs and perspectives of various communities. By incorporating these multifaceted elements into the future research design, the study aspires to contribute valuable insights to the ongoing discourse on digital inclusion and effective E-governance strategies in the context of Nepal.

7. Conclusion

This research investigated the impact of the digital divide on the implementation of e-governance in Rural Sudurpashchim Province, Nepal, with respect to digital governance. The findings highlighted the significant impact of income, education, age, and internet usage frequency on e-governance utilization.

The research underscored the possibility that e-governance initiatives could further widen the digital divide, specifically with regard to skill sets. It calls for proactive efforts to address the barriers faced by economically disadvantaged and elderly individuals in navigating the digital landscape. This research contributes valuable empirical evidence and serves as a catalyst for future inquiries, urging policymakers to adopt comprehensive strategies that ensure the inclusive benefits of technological advancements in Sudurpashchim Province, Nepal .

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