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E-Government: Smart City Indicator and its Implementation Status in Koshi Province of Nepal.

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Abstract: E-government is an indispensable component of effective governance in the contemporary era of information and communication technologies (ICTs). In developing and least developed countries such as Nepal, the advancement of e-government holds the potential for improved government-citizen relations. It is crucial to identify the precise challenges in order to overcome the inherent obstacles. Nepal has started introducing ICT to provide its citizens with access to a variety of government services. However, governments of developing countries like Nepal face numerous obstacles when attempting to implement these services via the Internet. The project aims to refine an existing model from wealthy countries for use in the Koshi province of Nepal. For this purpose, a literature analysis, key informant interviews and a questionnaire with a 5-ranking Likert scale were used. As digital transformation is accelerating, this method aims to create digital sustainability. It is difficult for the implementing agencies to meet this aspiration as the majority of the population lives below the poverty line and the level of IT service and literacy is also quite low. The Nepalese government is constantly striving to provide better services to its citizens. A number of successful initiatives and remarkable ventures have been implemented in Nepal. In this study, the Critical Success Factors (CSFs) for e-government implementation in the Koshi Province, Nepal have been identified so that a model for e-government can be proposed to the consumer to improve the effectiveness of e-government.

Keywords: E-government, ICT, Government-citizen relations, Government services Challenges, Government-to-Citizen, IT service literacy, CSFs, E-Governance effectiveness.

1. Introduction

Nepal is a country with geographical difficulties. About 25.3 million people live in inaccessible mountainous regions, which is a major obstacle to sustainable development and growth. The rural population accounts for 85% of the total population. Despite a progressive increase in the share of non-agricultural activities in gross domestic product (GDP), agriculture remains the most important economic sector in Nepal, accounting for 38% of GDP and employing over 80% of the population. The foundation of Nepal's e-government initiative is based on the realization that knowledge and information are fundamental components that contribute to effective governance, economic development, poverty alleviation and community engagement [1]. The central objective of the e-government initiative is to enhance the community's ability and value proposition to benefit from cost-effective access to services that are of great social and economic importance. This focus is also on developing public sector infrastructure and systems to enable the use of technology to provide services and good governance to impoverished communities who would otherwise have benefited little from government and for whom there is little chance that these services can be provided in the near future other than through the use of modern technology. The Nepal e-Government project has the following objectives: (i) establishing telecentres to improve last-mile access, (ii) modernizing rural communities by implementing wireless broadband networks to improve connectivity, and (iii) facilitating the exchange of data and information between governments and centralizing the management of government data and information through the government information and communication technology (ICT) network. [2].

Technology adoption in Nepal is progressing, but not at a pace sufficient to support the provision of broadband connectivity in rural communities. In the absence of this capability, real progress is unattainable. The telecenters that have been established represent significant efforts to bring these technologies to rural communities. More important than the fact, that the programme has failed to meet expectations is that a significant number of these facilities have stagnated because they are unable to achieve sustainability. Installing technology alone is not enough; a content and awareness model must also be implemented, as this experiment

shows. A whole of government approach, a partnership and collaboration model, global electronic trends, knowledge management and information sharing are outlined in this study as important prerequisites for successful e-government implementation and are used to summaries and describe a framework for e-government alignment. E-government can be described as a government structure that uses the Internet and the World Wide Web to provide government information and services to citizens. According to Richard Heeks, the application and use of information technology by a government organization constitutes e-government. Consequently, e-governance goes beyond Internet technology. Nepal has been implementing the e-government concept for quite some time, long before the e-government terminology itself emerged. By making the conventional administration accessible, transparent, efficient and accountable, it has the potential to overthrow it. The introduction of e-government in Nepal has not been very successful overall. Since Nepal's transition to a federal state [3], the government has faced greater difficulties in implementing policies, formulating plans and providing efficient services to the public through the use of modern technology. The country is not yet prepared for e-government, although mobile technologies, the internet and online media are extensively used. The country is currently in the early stages of adopting e-government, as shown by the e-government Development Index (EGDI). As a result of the ICT policy and the E-Government Master Plan (EGMP), Nepal is making progress in implementing e-government. The lack of allocation of a dedicated fund for e-government, insufficient citizen awareness, insufficient e-literacy, insufficient quality and professional ICT training, insufficient infrastructure and connectivity, cyber security and cybercrime, the digital divide, resistance to change by government officials and organizations, and other significant challenges (including financial, human resources, technical, organizational, and regulatory aspects) contribute to the overall difficulties of implementing e-government. The expected development in neighboring countries is hindered by these problems. Therefore, both the national government and the provincial governments of Nepal should develop an appropriate policy and strategy for Koshi province and the nation as a whole in terms of an effective e-government system. E-government utilizes information and communication technology (ICT) to facilitate a variety of online service delivery channels [4]. E-governance projects have been implemented worldwide since 2000. These initiatives are customer-centric and focus on efficient service delivery and rapid accessibility to ensure that e-government services are accepted and supported by users [5]. The best ones assume that the performance of e-government services can be improved. Whether this is the case depends on how large the discrepancy is between the current state of affairs and the desired path of e-government development [6]. It claimed that e-government enables communication and collaboration between government agencies, including public authorities (G-to-G), citizens (G2C) and businesses (G2B) [7]. According to the United Nations Development Programme, good governance means that government systems are competent, accountable, inclusive and transparent. It is imperative that all nations, both developed and developing, consistently strive for better governance. Good governance requires accountability, exchange and free flow of information transparency, and a lawful framework for improvement justice, respect for human rights and liberties, according to the World Bank. Social sector management that is sound in terms of efficiency, effectiveness, and economy comprises good governance [8]. Accountability, effectiveness, efficiency, participation, responsiveness, and adherence to the rule of law are a few of the characteristics that are emphasised by the various definitions and a multitude of other attributes associated with good governance. Good governance encompasses not only the constructive and active collaboration between the government and its citizens, but also the division of legitimate authority between the government and civil society [9]. The majority of e-governance studies and research indicate that the incorporation of ICT into the governance process facilitates effective governance [10]. E-government enables the realization of the fundamental tenets of good governance, including accountability, transparency, responsiveness, effectiveness, and efficiency. Nepal, a developing country, is currently experiencing financial challenges due to the influence of foreign powers [11-12]. Indeed, by acknowledging the significance of external advisors' dedication (Mishra and Aithal, 2021), it is intended to cultivate astute communities that can be realised through strategic planning, implementation, and investment [13]. Information and Communication Technology has emerged as the most environmentally friendly approach to communication and information dissemination. Its influence on societies, social institutions, and economies has been immense and multifaceted. The rapid progression of wireless communication technology in recent years has bestowed extraordinary advantages upon any society that has adopted its use. The emergence of electronic administration could be perceived as one of the surrender results

[14]. E-governance is the utilization of information and communication technologies (ICTs) to facilitate interaction between the political, commercial, and citizen sectors. Furthermore, ICT is employed by e-governance to streamline and improve the operational and democratic aspects of a government. E-governance's primary objective is to provide a streamlined, cost-effective, and gratifying interface between a centralized authority and its constituents. It is prepared to guarantee enhanced transparency, accountability, and impartiality, leading to public service that is both exceptional and cost-effective. E-governance also encompasses the provision of a unified interface for all phases of government offerings. It is linked to the development of an efficient structure for governing bodies and organizations. Advancements in technology, such as information and communication technology (ICT), are transforming every facet of conventional societies. E-Government services are an example of a generation-based governmental enterprise. Additionally, ICT has enabled the introduction of cutting-edge products and services, the delivery of existing ones in a more efficient, effective, and timely manner, and the exchange of information between government agencies and private entities in a cost-free manner. In addition, digital authorities face obstacles and opportunities when it comes to exchanging not only the operational methodology of government but also the very nature of governance. The private sector, civil society, and governmental activities and groups are all significantly impacted by its utmost capabilities. Government operations and the interactions between the government and enterprises and citizens are undeniably susceptible to trade. Therefore, in order to efficiently expand the use of e-Government, each of the three levels of presidency requires an appropriate strategy and set of plans. Finally, it aims to develop ICT equipment and media that will aid individuals and organisations in staying abreast of emerging prospects in the contemporary information economy. Nepal encounters numerous challenging circumstances when it comes to maintaining e-administration. These encompass political challenges, inadequate human capital, the absence of a robust criminal justice system, limited public awareness regarding ICT, and a dreadful ICT infrastructure nationwide. In government work environments, ICT resources are underutilized due to the absence of coordinated planning arrangements. Expert officials also present a formidable challenge, as they perceive ICT to be a risk to operational security [15].Globally, the notion of Smart Cities has become increasingly prevalent as urban areas strive to improve the standard of living for their inhabitants in novel and inventive ways. The incorporation of information and communication technologies (ICT) is crucial to this endeavour of urban transformation, specifically in regards to the deployment of e-government systems. The present study examines Smart City indicators and E-Government initiatives in the Koshi Province of Nepal in order to obtain a comprehensive understanding of the advancements, obstacles, and potential prospects for enhanced governance in the area that is both citizen-centric and efficient. The significance of Smart Cities in promoting sustainable urban development necessitates a corresponding emphasis on e-government, which serves as the foundation for effective service provision, openness, and citizen participation. The objective of this study is to analyze the present condition of Smart City indicators and e-government deployments in the Koshi Province of Nepal. By doing so, it seeks to provide insights into the ways in which these technological progressions are influencing the trajectory of this particular mountainous area.

E-Government, an integral component of Smart City development, holds the potential to revolutionize public services, enhance administrative efficiency, and empower citizens. In the context of Koshi Province, Nepal, it is imperative to identify the specific Smart City indicators related to E-Government that can facilitate informed decision-making and enable the development of a more technologically advanced, transparent, and citizen-centric governance system. The key needs for identifying these indicators in the Koshi Province of Nepal include:

- **Efficient Service Delivery:** E-Government initiatives should focus on streamlining the delivery of essential public services, such as permits, licenses, and registrations, ensuring that citizens and businesses can access these services online, thereby reducing bureaucratic hurdles and enhancing convenience.
- **Transparency and Accountability:** Transparency in government operations is vital for building trust among citizens. E-Government systems should enable the easy access of public information, financial transactions, and decision-making processes, making it more transparent and accountable.
- **Digital Inclusion:** In a diverse and geographically dispersed region like Koshi Province, it's essential to ensure digital inclusion. Smart City indicators should assess the availability and

accessibility of digital services to all segments of the population, including marginalized and remote communities.

- **Security and Data Privacy:** Protecting citizen data and ensuring cybersecurity are paramount. Indicators should assess the robustness of security measures and data privacy policies in place to safeguard sensitive information.
- **Citizen Engagement:** E-Government should encourage citizen participation in decision-making processes. Smart City indicators should gauge the effectiveness of platforms for citizen engagement, such as public feedback mechanisms and online consultations.
- **Interoperability:** Ensuring that various government systems and databases can communicate with each other is crucial for e-government success. Indicators should evaluate the level of interoperability and data sharing among government departments and agencies.
- **Capacity Building:** Assessing the readiness and capacity of government officials and staff to effectively utilize e-government tools and platforms is essential. Training and skill development programs should be considered in the indicators.
- **Sustainability:** Smart City initiatives should be sustainable in the long term. Indicators should consider the financial sustainability of e-government projects and their alignment with broader environmental and social sustainability goals.
- **Feedback and Continuous Improvement:** Regular feedback collection and analysis are vital to refine e-government services. Indicators should focus on how feedback mechanisms are integrated and how improvements are implemented based on citizen input.

Identifying and monitoring these Smart City indicators for e-government in Koshi Province of Nepal, will help assess the effectiveness of e-government initiatives, address the specific needs of the region, and ensure that technology is harnessed for the benefit of all citizens.

2. Literature Review

Verma et al. (2023) examined E-Governance, also known as "electronic governance" or "e-government," denotes the utilization of information technology to facilitate communication channels, information sharing, and administrative tasks. Additionally, it encompasses operational and reciprocal actions between the government and its personnel, enterprises, citizens, and other governments, as well as the establishment of numerous comprehensive systems among them. E-governance facilitates the public's access to administrative support in a transparent, efficient, and practical manner. The advancement of any country is contingent upon e-government. Nepal is classified as a developing nation. Nepal encounters numerous obstacles spanning across technological, political, social, cultural, and geographical domains. The primary emphasis of this study is on the diverse components and factors that contribute to the success of its implementation.

Sharma et al. (2023) described during and after the global COVID-19 outbreak, this essay tries to highlight digital governance in Nepal. In this study's main goal is to review a number of the growth of e-governance and e-government in developing nations like Nepal. In times of crisis, policy makers and other leaders can utilize the study's findings to build effective e-government rules and laws. The essay provides law enforcement professionals with suggestions on how to help citizens in times of need. The different sectors in which e-government has been implemented are highlighted in this paper, along with the challenges facing its full state-wide implementation.

Mishra et al. (2022) examined Green funding is most socially important for future preservation. The critical examination focuses on green financing, a fresh and innovative financial idea that is vital for economic stability and sustainable growth. International financing for Nepal is examined through descriptive research. Literature-dominated conceptual research is exploratory. Personal interviews with key informants. Professional perspectives were documented using grounded considering pros, cons, status, and actions. The growing environmental impacts of globalisation have forced enterprises worldwide to undertake numerous green programmes that promote capitalism and ecology while fostering a climate-resilient future. Green financing has been shown to be relevant to all industries that can use it to achieve overall green growth. Green financing is a niche concept, but its execution has been very beneficial. Practical and relevant aspects of future green funding have been addressed in a broader framework to boost academic understanding and interest.

Bhagat et al. (2022) described Nepal has implemented ICT to provide its citizens with government services. The government has many challenges when implementing internet-based services in impoverished nations like Nepal. The aims to create a G2C-based e-Governance model using the identified BAFs for successful e-Government service implementation. The aims to modify a developed nation's model for Nepal. The goal was achieved by a literature study, key informant interviews, and a five-point Likert scale questionnaire survey. It establishes digital sustainability amid rapid digital development. Implementing agencies face daunting challenges due to low IT service literacy and a large population below the poverty level. Nepali government officials have never stopped trying to improve services. Successes like the citizen application have occurred in Nepal.

Aithal et al. (2021) examined Nepal's infrastructure is poor despite its modest wealth. Foreign help is seen as crucial to Nepal's growth. The secondary data from 2001-02 to 2014-15 is used to study Swiss aid. The analysis using normality and correlation to determine the link between GDP, Swiss Aid, and total Aid. Assisting substantially affects real GDP. A well-fitting regression line shows that Swiss aid accounts for 85% of real GDP, with the remaining 14% influenced by other variables. The LNTAD coefficient is 0.35, therefore 1% more total aid increases real GDP by 0.35%. The positive and statistically significant LNTAD coefficient indicates that aid increases Nepal's economy. Autocorrelation among error terms is ruled out using the Brush-Godfery LM test when the P value is more than 5%, which is 32% here. The using an inferential model, this empirical study shows how development assistance affects Nepal.

Adhikari et al. (2020) described The Digital Nepal framework, E-learning, management, administration, and governance relied on information and communication technology policy and regulatory frameworks to ensure accountability, transparency, and responsibility at all societal and state levels. The ICT policies and its effects on e-learning in Nepal during Covid-19. Reviewing secondary sources such the Nepal government's ICT-related Act, policies, plan, and programme, journals and reports dominated contextual analysis. The Google Forms/Microsoft Team 365 online survey began in February 2021. The 2000 and 2015 IT policies prioritised human resource and ICT infrastructure development. Nepal had 57% Internet penetration in 2017, compared to 36% in South Asia. The primary poll found that IT infrastructure, network quality, internet connection, and internet cost are the biggest e-learning barriers. As part of its effort to digitise services, the government offered internet cost subsidies to educators and students.

Buddhacarya et al. (2019) examined the e-revolution and business ICTs have led to e-business. E-Government represents the world's most developed nations and is attracting global attention. Nepal has made significant development in the ICT sector, establishing e-services including the National Identity card. Mobile technology and devices have expanded citizens' use of e-services, making e-Governance a prominent topic. The government must apply and modify the e-Governance model and services to help residents live their daily lives due to the rapid growth of internet and social media use in Nepal. The Nepalese e-Governance system must be implemented in a favourable atmosphere and overcome its main hurdles.

Pokhrel et al. (2019) described Demographic, environmental, and unplanned urbanisation have increased risk and uncertainty for many cities, threatening their social, economic, and environmental viability. Given the volatility of socioeconomic, environmental, and other socio-political hazards, resilience is essential. Resilience has been a driving force in many cities worldwide, preserving ecosystem products and services and improving urban ecology to ensure a sustainable future. Kathmandu is one of the capital cities growing fastest due to unplanned development, loss of green space, catastrophic events like earthquakes and floods, and other environmental issues that cause devastation, economic damages, loss of human life and health, and habitat degradation. The factors in this study are slope, population, recent land use/land cover, health facility location, emergency service locations, water bodies, emergency route network, and population.

Karki et al. (2019) examined Nepal's public education history is shady. It has shaped sociopolitics for almost a century through substantial growth. However, its quantitative aspect has been only modestly respected, while its qualitative aspect has been continuously criticised. The last two decades have seen much research on how Information and Communication Technology (ICT) might help Nepal's education system improve. Government and non-government entities have worked to integrate ICT into public education.

Pradhan et al. (2018) described After the digital disruption, governments worldwide are considering big data technology to improve operations. Governments use this technology to transform electronic

governance. Most of the citizen-centric data created by smart phone and web use is unstructured. Governments must adopt this technology to analyse and analyse massive amounts of data. The feasibility of using unique problem-solving methodologies to integrate Big Data applications into Nepalese e-government service digitization. Due to ICT infrastructure expansion and global digitalization, Nepal's e-Government services may use Big Data technology to tackle governmental concerns.

Nagaraja et al. (2016) described A developing nation India. The government must provide good governance to fulfil socioeconomic goals. During the ICT era, almost every nation used ICT to supply essential goods and services to the public. All sectors of the Indian economy are affected by e-governance. The Indian government has launched e-governance projects to supply all services electronically as much as possible. The origins of e-governance are usually 70 years or older. Various egovernance efforts followed. In the meantime, the Indian government launched e-seva, smart govt, digital India, e-kranthi, and others to promote e-governance. Each endeavour seems to benefit the public more. Despite this procedure, electronic governance has some challenges. Simply put, these hurdles seem to hinder e-governance. Limitations include socioeconomic, cultural, technological, privacy, and security.

Davies et al. (2015) examined Electronic and digital government policies foster economic growth, public engagement in democratic public life, reduced administrative burdens on citizens and enterprises, and efficiency. The European Union supports cross-border services for enterprises and mobile residents that provide services throughout the single market by promoting best practises among national, regional, and local authorities in Member States. Over the past 15 years, Europe has made progress in adopting digital government services, but not enough to reach its goals. Several chores remain. These include improving security and trust, promoting cross-border service interoperability, encouraging citizens to communicate with governments via digital platforms, using open data, and maximising cloud computing efficiency.

Kharel et al. (2012) described e-Government uses information and communication to improve and revolutionise government activities. E-Government Index in Nepal is low compared to other countries. Nepal faces various e-Government implementation issues. Low literacy, low per capita income, weak ICT infrastructure, insufficient human resources, leadership and commitment, and insufficient financial resources are Nepal's main e-Government implementation obstacles. In this study presents a conceptual framework for effective and efficient e-Government implementation in Nepal.

Table 1.2 Comparison table of review

Author and Year	Topic	Findings	Summary
Verma et al. (2023)	E-Governance and challenges in Nepal	Discusses the concept of e-governance, its importance, and the challenges faced in Nepal.	Highlights the role of e-governance in facilitating administrative tasks and addressing challenges in Nepal.
Sharma et al. (2023)	Digital governance during and after COVID-19	Highlights the role of digital governance during a crisis and discusses its implementation and challenges in various sectors.	Emphasizes the importance of e-government in crisis situations and the challenges it faces in Nepal.
Mishra et al. (2022)	Green financing and international financing in Nepal	Green financing is important for sustainable growth and economic stability.	The study explores the relevance and benefits of green financing in Nepal's context, emphasizing its role in promoting green growth across various industries.
Bhagat et al. (2022)	E-Governance in Nepal	E-Government implementation faces challenges in Nepal. Successes have been achieved,	The research discusses the challenges and successes of implementing e-Governance

		and a G2C paradigm is proposed.	in Nepal, with a focus on government-to-citizen (G2C) services.
Aithal et al. (2021)	Impact of foreign aid on Nepal's development	Swiss aid has a significant impact on Nepal's real GDP. Aid positively affects the economy.	The study examines the impact of foreign aid, specifically Swiss aid, on Nepal's economic development, with a focus on its contribution to the GDP.
Adhikari et al. (2020)	ICT policies and e-learning in Nepal during COVID-19	ICT policies and infrastructure affect e-learning. Internet cost and quality are barriers to e-learning.	This research explores the impact of ICT policies and infrastructure on e-learning in Nepal, with a focus on barriers related to internet cost and quality during the COVID-19 pandemic.
Buddhacarya et al. (2019)	E-Governance and digital services in Nepal	Rapid growth of internet and social media usage in Nepal necessitates e-Governance adaptation and overcoming challenges.	The study highlights the need for adapting the e-Governance model in Nepal to accommodate the growth of internet and social media use and address key hurdles.
Pokhrel et al. (2019)	Urban green space development in Kathmandu	Evaluates urban green space development using GIS and AHP-based analysis in Kathmandu.	The research focuses on assessing urban green space development in Kathmandu, considering various factors like slope, population, land use, and emergency services.
Karki et al. (2019)	Integration of ICT into public education in Nepal	ICT integration in Nepal's public education system.	The study discusses the integration of Information and Communication Technology (ICT) into Nepal's public education system and its potential benefits.
Pradhan et al. (2018)	Adoption of Big Data technology in Nepalese e-Government	Feasibility of using Big Data technology in e-Government services in Nepal.	The research explores the potential use of Big Data technology to address governmental concerns in e-Government services in Nepal.
Nagaraja et al. (2016)	E-Governance in India	Overview of e-Governance in India, its development, and challenges.	The study provides an overview of e-Governance in India, discussing its development over time and the challenges it faces, including socioeconomic, cultural, technological, privacy, and security issues.
Davies et al. (2015)	Digital government	Discussion of digital government policies in the EU	The research explores the policies related to digital

	policies in the European Union	and their goals and challenges.	government in the European Union, focusing on goals and challenges, including issues like security, interoperability, and citizen engagement.
Kharel et al. (2012)	E-Government implementation in Nepal	Challenges and obstacles to e-Government implementation in Nepal.	The study identifies the obstacles and challenges facing e-Government implementation in Nepal, including factors like low literacy, weak ICT infrastructure, and financial resources.

3. Research Methodology

This research has adopted a mixed-methods approach, incorporating both qualitative and quantitative procedures. The combined approach's main goal is to overcome the shortcomings of both the qualitative and quantitative methodologies. By using a mixed strategy, the problem of the single technique was mitigated and the reliability of the data collected was guaranteed.

3.1 Research Framework

To determine the importance and key elements influencing the implementation of E-government, this analysis is being conducted. Based on data analysis on these variables, the general independent variables, including age, genders, and education, are compared to the dependent variables, which include challenge, awareness, barrier, and implementation. To better understand the analysis, refer to Figure 1 below:

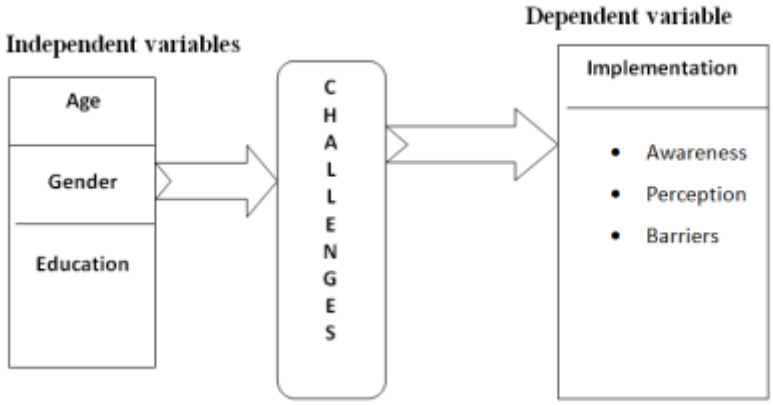


Figure. 1: Elements influencing the deployment of e-government.

3.2 Population and Sampling:

The purpose of the research was to determine how people of Koshi Province felt about the e-government services that are offering and to determine how aware they were of these services given their popular neighbouring countries like Bangladesh and India. The respondents' level of focus and recognition of e-government became recognised as a critical component, as the most accurate results will come from citizens with the necessary knowledge of the number of difficulties. Furthermore, this course elaborates on the intricacies of sample strategy and pattern size.

3.2.1 Data Collection:

One method of data collection may not be sufficient to answer the Research questions. Therefore, a variety of

data collection methods were used in this study. Questionnaire surveys and content analysis dominated the research studies' data collection procedures.

Table 1.3: sampling design

S. No	Level Province no 1, Nepal	Respondents in %	Total No. of Respondents
1.	**Local Governments** • LGs of Sunsari District's IT Officers • LGs of Morang District IT Officers • LGs of Jhapa District IT Officers	25%	100%
2.	**University/College Professional**	9.0%	
3.	**Business (ICT) level service provider** • Telecom Professionals & Engineers • ISP Professionals • Bank IT professionals	14.5%	
4.	**Citizens / Service seeker**	3.5%	

3.3 Sampling:

1. **Total Number of Questionnaires:** The initially planned to distribute 100 questionnaires to collect responses.
2. **Percentage of Responses Received:** The actual responses received amounted to 53% of the total questionnaires distributed.
3. To allocate these responses into the four mentioned groups based on the original plan:
4. **Local Governments (LGs) IT Officers:** The plan was to collect 25% of the responses, which translates to 25 respondents. However, since the actual responses received amounted to 53%, it's likely that most of these respondents came from this group.
5. **University/College Professionals:** The original plan was to gather 9% of the responses, which should have been approximately 9 respondents. The actual number of responses from this group was not specified.
6. **Business (ICT) Level Service Providers:** In this study aimed to collect 14.5% of the responses, which would be around 14 or 15 respondents. The actual number of responses from this group was not provided.
7. **Citizens/Service Seekers:** The plan was to obtain 3.5% of the responses, which translates to about 3 to 4 respondents. The actual number of responses from this group was not specified.

In this study originally intended to distribute 100 questionnaires but received responses from 53% of them. The majority of responses likely came from the Local Governments (LGs) IT Officers, while the exact number of responses from the other groups was not specified. The sampling design's distribution was not achieved as initially planned.

3.3.1 Questionnaire Survey

The facts series method utilised in this study, particularly with regard to the CSFs' successful implementation and adoption of e-governance, was a questionnaire survey approach. In this questionnaire survey, the query format was closed-ended and Likert scale degrees ranging from "strongly agree" to "strongly disagree" were utilised; respondents were provided with solutions from which they were required to select one. Conversely, in order to validate the proposed model, the questionnaire survey employed a pattern of open-ended and subjective questions.

3.3.2 Questionnaire Development

A standard set of questionnaires was created for both carrier carriers and carrier seekers, since the Examine studies are intended to identify the CSFs of e-services from delivery and call for aspect residents. A variety of statements were identified in order to elicit the respondent's attention and attitude, which were subsequently assessed using a five-point Likert scale ranging from strongly agree to strongly disagree on a scale from 1 to 5. Subjective and open-ended formats were employed to validate and evaluate the proposed model. Additionally, responses regarding particular aspects of e-offerings were analysed.

3.4 Objectives

Federal Nepal is facing many challenges, as has been noted, and further study is necessary to identify the main barriers to Nepal's e-Government services and system. Thus, the primary goal of this research is to develop a suggested G2C-based e-Government model based on the identified fundamental achievement factors (BAFs) for the practical implementation of e-Government services.

3.5 Hypotheses Testing

H1: There is no significant difference between perspective of male and female regarding e-government awareness.

H2: Knowledge and attitudes towards E-government challenges: Human, Technological, financial, legal, regulatory & other, are positively related to level of education and qualification.

3.6 Validation of Model:

The analysis and validation of the suggested model have been done utilising a qualitative research approach and the case study research strategy. Data was gathered from the exports of ICT and e-Government using an email questionnaire method. The CSFs that were taken from the data analysis and findings were then mapped to the Diffusion of Innovation, or DOI, theory in order to form the email questionnaire. Based primarily on the CSFs' specific definitions and how they relate to the DOI principle definitions, the mapping between the retrieved CSFs and the DOI idea was completed. To facilitate the validation and assessment of the proposed model, a group of ten experts with appropriate understanding of ICT and e-government have been emailed a set of eight questions and the suggested model.

4. Result & Discussion

4.1 Critical Success Factors for E-Government implementation:

The idea, knowledge and implementation factors of e-government were taken into account in the questionnaire on critical success factors. Respondents who selected important or unimportant in their questionnaire responses were offered the vital success elements as an option. The questionnaire contained fourteen (14) multiple choice questions on the CSFs to collect relevant data. Various statistical tools, including SPSS and Excel, were used to analyze the data from the questionnaire on the vital elements of success for relevance.

Table 1.4: Critical Success Factors

Success Factors		**Responses percent**	**Percent of Cases**	**Description**
1.	**Separate Funding**	9.1%	100%	Appropriate funding is required. Financial resources that are not managed can kill a project.
2.	**Adequate Legal Regulatory Framework**	7.1%	100%	E-government project achievement necessitates a legal regulatory framework that is both effective and adequate.
3.	**Government Department Goals**	6.1%	100%	E-Government should be accompanied by well-defined organisational and

				departmental goals and objectives of the government.
4.	**Clear Vision and Strategy**	5.1%	100%	Define the project's vision and strategic plan.
5.	**Training**	8.2%	100%	Provincial and local governments should coordinate ICT training in order to enhance capacity.
6.	**Awareness**	9.6%	100%	e-Government initiatives should be delegated to government employees, citizens, government agents, and other businesses with the aim of attaining success.
7.	**Citizen Involvement**	4.1 %	100%	By preserving public confidence, the government should consider how to increase the number of citizens who utilise its e-services.
8.	**E-Skills**	6.5%	100%	E-authorities task completion necessitates identifying and acquiring the required e-skills for the project and enhancing them.
9.	**Top Management And Government Support**	8.1%	100%	Effective leadership, support, and commitment from top-level management are essential for the successful completion of an e-Government project.
10.	**ICT Infrastructure**	9.4%	100%	E-Government is supported by ICT infrastructure, including high-speed internet, computer hardware, software, servers, and data centres, among others.
11.	**Citizen Empowerment**	9.2%	100%	Citizen Empowerment should also be a government priority for e-Government to be successful.
12.	**Change Management**	8.7%	100%	In order for e-Government projects to be implemented effectively, both the traditional organisational structure and the mindset of government officials must be altered. To this end, various training programmes and initiatives must be designed.
13.	**Security and privacy Management**	6.3%	100%	e-government project success necessitates a robust security and privacy infrastructure in addition to skilled personnel.
14.	**Monitoring, Evaluation & Feedback**	9.0%	100%	The absence of monitoring, evaluation, and feedback regarding the success and failure rates of duties begs the question of how effective e-government can be considered.

The information obtained from the facts was then labelled with the most important CSFs and their percentage frequencies for the implementation of e-government. Table 1.4 shows a number of CSFs that emerged from the data analysis. The conceptual framework and CSF categories from the data analysis and results, as indicated in Table 1.4, served as the basis for the proposed framework.

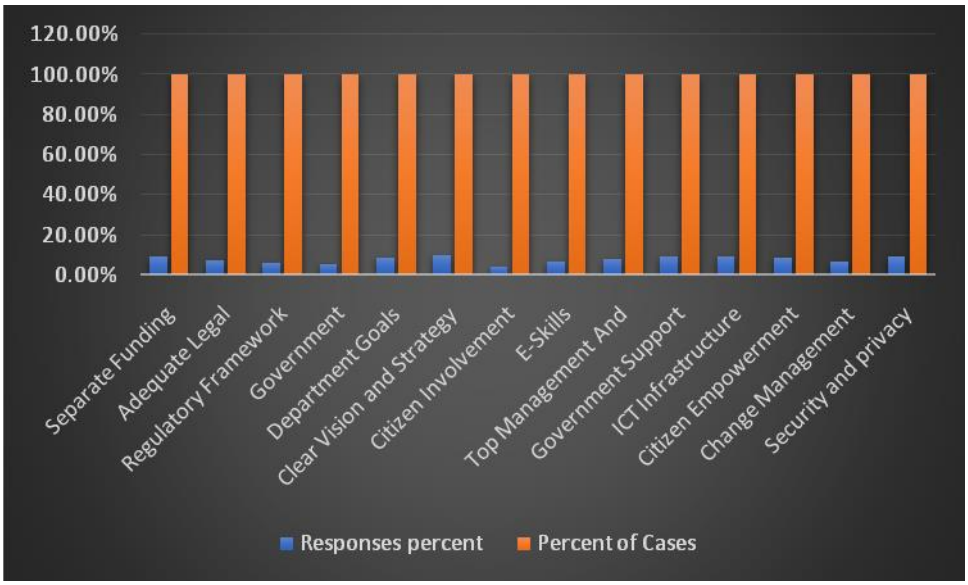


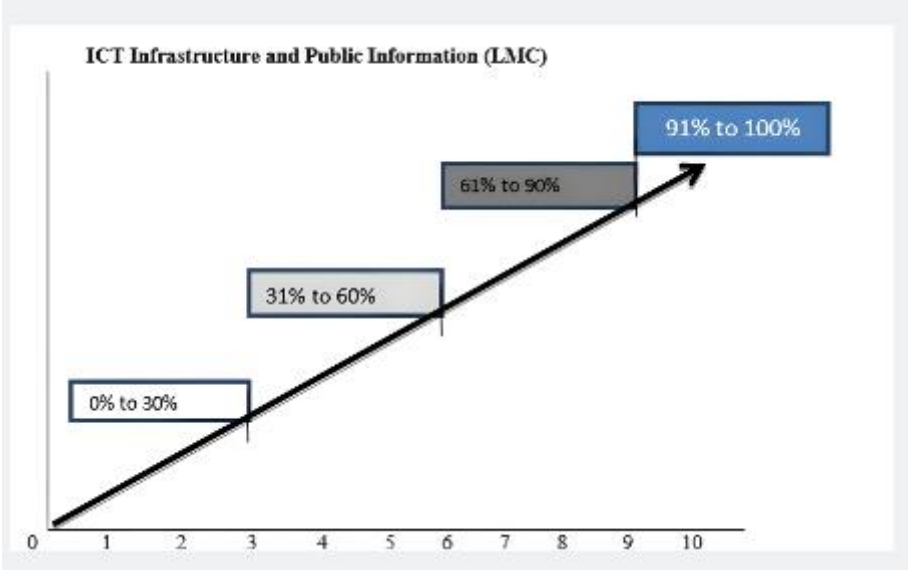
Figure 2. Graphical representation Critical Success Factors.

The proposed model was complemented by an eight-question questionnaire to collect pertinent responses from ICT and e-government experts and to assess and validate the model through a continuous comparison with previous research by the same research team. The focus was on the relationship between e-government and consumers (G2C). Various statistical tools, including SPSS and Excel, were used to analyze the collected data. The relevance test consists of assigning the appropriate frequencies to the data sets obtained from the collected statistics. The structure of the proposed model proved to be robust in its current form and did not require any changes. The relationship and mapping between DOI and CSFs were found to be satisfactory by the majority of respondents (7 out of 9); two respondents chose not to comment. Adding, combining and splitting success factors were not favoured by any of the respondents. Today's professionals strive to optimize the compatibility between manual and automated work in order to streamline processes and improve methods. The implementation of e-governance is a lengthy process that requires financial and time investments. It is not something that can be completed overnight. It also requires reengineering throughout the organization. The significant benefits it brings to the working environment in terms of task completion are amplified.

4.3 ICT Infrastructure and Public Information

The ranges of measurement indicators for data on the availability of public information and ICT infrastructure. It can be seen that seven indicators are within the progression ranges of 0% to 30%. The availability of smart poles including solar panels and other components is the only category of indicators that falls within the 31% to 60% range. Similar proportions of the population using the internet and accessible open data fall within the remit of this municipality and range from 61% to 90%. Open data refers to information that is accessible to the general public and includes resources such as budget information, policy documents, development reports and other materials available on publicly accessible websites. In the ICT infrastructure and public information category, access to telecommunications was found to be a more favourable indicator. Access to telecommunications was rated at either 91% or 100%.

Y- axis



X-axis

Figure 3: Public Information & ICT Infrastructure (LMC).

Index	Measurement Indicators
0% to 30%	**1**.Access to real time traffic information to citizens **2.** Digital Signature **3.** ICT Based Urban Map and addressing system **4.** Digital Information Boards at Public spaces, main commercial area and streets nodes **5.** Early Warning System **6.** Public Internet Access Point (Kiosk) **7.** Public WiFi Hotspot
31% to 60%	Smart Poles (with solar panel)
61% to 90%	Availability of open data
91% to 100%	Access to telecommunication

5. Conclusion

As a result, the critical aspects of infrastructure, technology integration, sustainability and citizen engagement are highlighted through the analysis of smart city indicators in Koshi Province, Nepal. The current progress and obstacles in smart city initiatives in the region are highlighted through these findings. The importance of integrating technological solutions to improve public services, transparency and citizen engagement is emphasized through the important role that e-government plays in modern governance. It highlights how e-government efforts can lead to better relationships between government and citizens. However, it also recognizes that there are barriers, particularly in countries such as Nepal where a significant proportion of the population is impoverished and where IT literacy is low. The main objective of the research, which focuses on a G2C (government-to-citizen) paradigm, is to identify the essential elements required for effective adoption of e-government services. The hope of transferring a proven model from wealthier countries to Nepal. Key informant interviews, a Likert scale questionnaire and a literature review were part of the mixed methods strategy the researchers used to achieve their goals. The critical success factors associated with e-government adoption. Funding, legal and regulatory framework, vision and strategy, training, awareness raising, citizen engagement, e-skills, top management and government support, ICT infrastructure, citizen empowerment, change management, security and privacy management, monitoring, evaluation and feedback were all found to be essential components for achieving successful outcomes. Legal and regulatory framework, vision and

strategy, training, awareness, citizen participation, e-skills, top management and government support, ICT infrastructure, citizen empowerment, change management, security and privacy management, monitoring, evaluation and feedback were identified as critical success factors for e-government implementation. Expert opinions and data analyses were used to validate the proposed model. According to the results of the study, the proposed model is robust and consistent with the theory of diffusion of innovations. Furthermore, it underlines the need for continuous investment in e-governance and the importance of maximizing compatibility between manual and automated processes. ICT infrastructure and public information indicators were also assessed as part of the research. Access to real-time traffic information, digital signatures and smart poles are among the areas that still have potential for development. However, access to telecommunications is comparatively advantageous. The study provides insightful information on the difficulties and essential elements of e-government implementation in Nepal. It emphasizes the need for continuous efforts to improve access to public information and ICT infrastructure to promote successful governance and government-citizen relations in Nepal. The G2C-based e-government model provides a way forward for further progress in this important area.

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