

Assessing the State of E-governance Responsiveness at Local Level: A Case Study of 1st Level Administrative Units of India, Nepal and Bhutan

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ABSTRACT

This paper aims to contribute through adapting widely accepted models to ascertain compare and comment on state-level local governments in selected South Asian countries- India, Nepal, and Bhutan. We aim to portray the disparities among the local governments and emphasize the importance of national surveys. The websites that governments host to describe and host various services are a potent source of data. Scrutinizing the state of the websites systematically should therefore help countries to assess, monitor, compare and plan for improvement. UNs' EGDI survey and LOSI helps to assess and compare the countries in terms of their web presence and helps to ascertain their e-governance maturity levels. However, these indicators do not cater to find the disparities among the local governments of a country. We have adopted the UNs' e-government model and designed a unique questionnaire to ascertain the disparity. We find that even though the countries have progressed at the national level there are disparities among the local governments. Based on our findings we have formulated some recommendations for the countries to adopt and ensure the gap between the laggards and the leaders reduces.

CCS CONCEPTS

• **Computers in Other Domains**; • **Computing in Government**; • **E-government**;

KEYWORDS

E-government, E-governance, local government, 1st level administrative units, provinces, states

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1 INTRODUCTION

Information and communication technology (ICT) is one of the most significant enablers of socio-economic prosperity. It has also been observed that ICT brings greater leverage to developing countries than to developed ones. In many countries adoption of ICT at the service delivery level worked better when the governments took the leading role. Hence, we can easily conclude that a country's prosperity has a positive correlation with the state of ICT use at both the national and local government levels. Here comes the concepts and practices of e-governance and e-government. But two questions need to be answered: 1. How can we help the lagging countries to get mature in adapting ICT? and 2. How can we monitor the state-of-art of their digital transformation? The anthology of the discipline of e-governance has many models of which many have been adopted. However, monitoring the state-of-the-art of adaptation process has largely been dependent on the claims of the nations in their reports published periodically. An alternative to this process is conducting surveys by independent researchers, individuals, and international bodies. The websites that governments host to describe and host various services are a potent source of data. Scrutinizing the state-of-the-websites systematically should therefore help countries to assess, monitor, compare and plan for improvement. However, the problem lies in choosing the websites. Surveys done based on the national level may differ from the surveys based on the local government level. Also, there are disparities among the local government levels at a country level- one city may be far ahead than others, or state-level web services may differ from city-level services. This paper aims to contribute through adapting widely accepted models to ascertain to compare and comment on state-level local governments in selected South Asian countries-India, Nepal, and Bhutan. We aim to portray the disparities among the local governments and emphasize the importance of national surveys.

United Nations E-Government survey evaluates the e-government performance of countries around the world every two years and ranks them based on EGDI (E-Government Development Index) score [1]. EGDI survey is published by the United Nations Department of Economic and Social Affairs (UN DESA) that has become the benchmarking reference for e-government [2]. It is a weighted average of normalized scores on the three most important dimensions of e-government- OSI, TII, and HCI¹. To complement the national level scrutiny, the LOSI [2] process survey one or two

¹https://www.researchgate.net/publication/341141751_Statistical_Analysis_of_E-Government_Development_Index_EGDI_of_Georgia

selected cities from each country which was initiated in 2018 as a pilot study assessing portals in 40 cities that seeks to evaluate the progress in local e-government development [2]. Local Online Services Index (LOSI) is a study that assesses progress made in local e-government development through the e-government portals of cities [2] [3]. Countries scoring high on EGDI, and LOSI are top on the economic performance and competitive scoreboards. This strong link indicates that better e-governance is an enabler of prosperity in the global economy [4] [5] [6] [7] [8]. However, these indices are not aimed at indicating the disparity among the local governments in the countries. Hence it is important to adapt the models and build a context-sensitive survey mechanism to help ascertain the disparity among the local governments in a country. In [9], the authors of the paper showed the disparity among various city governments of Bangladesh. This paper takes the same course of analysis as has been taken by the authors in [9].

To conduct a comparative analysis of e-government responsiveness (at the local level) we wanted to choose an area in the developing world that is populous, ethnically and culturally diverse, economically growing, and familiar with the experience and cultural understanding of the principle surveyor. Hence the case study is based on three South Asian countries- India, Nepal, and Bhutan. India is the second most populous country in the world and the most populous in South Asia. It has an approximately 1.38 billion population [10], 22 official languages, and 270 mother tongues [11]. Hinduism, Islam, Christianity, and Buddhism are the major religions followed by the people of India but some other religions like Sarnaism, Jainism, Zoroastrianism, Judaism, and the Bahá'í Faith are also found here [12]. According to UNs' EGDI survey 2020, India scored 0.5964 [2]. Ten years ago, in 2010 the EGDI score was 0.3567 [13]. Indias' overall e-government performance has been improved remarkably in these 10 years. Accordingly, to the LOSI survey, Mumbai, a city in India that has a LOSI score of 0.4575, with a LOSI rank of 33, belongs to the middle LOSI level in 2020 [2]. Nepal and Bhutan are landlocked countries, surrounded by India and China [14]. Approximately Nepal has a population of 30 million [15] and Bhutan has 867,775 [16]. Between the two, Nepal is more open to international trade and tourism. The uniqueness of these three countries helps us to understand e-government responsiveness in three types of countries - 1. Regional economic power hub, populous, diverse, open, and trading country (India), 2. Mid-level economically developed at a regional level, populous, open, landlocked (therefore dependent bordering country for any trade) country (Nepal), 3. Mid-level economically developed at a regional level, less populous, closed, and landlocked (therefore dependent bordering country for any trade) country (Bhutan).

Availability of the websites of local governments is very important for implementing good e-government at the local level. We have reviewed a total of 51 (however at the time of scrutiny 36 websites were accessible) websites of primary active administrative units in India, Nepal, and Bhutan. The paper adopted the first four stages of the United Nations E-Governments' 5-stage model [17] to evaluate the responsiveness of the primary administrative units' websites of these 3 countries. To contextualize the present condition of the countries, we have not used the 5th stage from this model in this research. As none of the surveyed had any indication, the fifth

stage seemed s advanced for these 3 countries. The questionnaire was adapted from LOSI [18] and Kriyars' model [19].

The goal of the paper is to-

- (Understand) Understand and evaluate the state of website responsiveness of the e-governance websites at 1st level local governments of India, Nepal, and Bhutan.
- (Compare) Conduct a comparative study among the surveyed administrative units
- (Recommend) Point out the lack in various levels of responsiveness to help conduct necessary modifications and addition in their websites.

The rest of the paper consists of 4 sections. Section 2 hosts relevant literature, section 3 describes the methodology that has been used for evaluating the status of local e-government for this study, section 4 discusses the data, and the result of this analysis and section 5 presents the discussion and conclusion of this research.

2 LITERATURE REVIEW

According to Palvia [20], e-government is a term used for referring to web-based services from local agencies, states, and federal governments. In e-government, information technology is used to provide diverse government services, involve citizens, and support government activities. E-governance is the use of information and communication technologies at different levels of government, the public sector, and outside for the goal of enlarging the e-government system. Fang [21] argues that e-governance is more holistic than e-government. E-government delivers information and services to the public. E-governance covers government-citizen participation. For this research, we adopted a more instrumental definition of e-government. According to [22] it is the use of information and communication technologies (ICTs) to improve the activities of public sector organizations. E-government is not just creating websites exchanging emails, getting useful information from online, online transactions. A new concept has been added to the e-government system to the world information technology- transparency, accountability, citizen participation, etc. [23].

Ndou [24] has shown some opportunities and challenges of e-government. E-government helps to make better decisions, reduce time and costs in services, and improve the quality-of-service delivery. They have shown some countries that have been benefitted from e-government. A system is available in Beijing Park which improved the efficiency and responsiveness of e-government. A business choosing this system can reduce the time from 2-3 months to a few days for approval of specific applications. The Columbian government portal allows citizens to look for government information, consult, complain or make suggestions. In Bahia, Brazil, citizen service centers are present in shopping malls or other public places. These citizen service centers offer more than 500 services. Citizens can apply for jobs, identity card, passport, etc. simultaneously and they are highly satisfied with this service system [24]. E-government also increases transparency, accountability and reduces corruption. For example, in India, the Central Vigilance Commission (CVC) has created a website that can increase transparency by sharing a huge information related to corruption with citizens. This website communicates directly with the public about fighting

corruption and makes public the names of officers from the administrative and revenue services against whom investigations are ordered. The capacity of the government is also increased through the use of ICT. ICT is used for reorganization of internal administration transactions, communication, and easy information flow. For example, the Time Saver Center in Sao Paulo, Brazil provides multiple services together in a single location. The objective of this service is to increase customer satisfaction of the citizens. People can receive different types of services at the same time like-vehicle registration, identity card, driving license, unemployment insurance, etc.

To ensure the successful implementation of e-government programs, suitable e-government models need to be adopted. These models compose of various steps to indicate the maturity level of the entity. It is easier to accomplish the objectives of e-government programs by analyzing how they are faring at each stage. Various writers proposed various e-government models including a different number of different stages. Many authors have analyzed some existing e-government models and then proposed their model.

Baum and Di Maio [25] proposed a model (2000) that comprises four stages. The first stage of this model is “web presence” where basic information about the websites is presented to the public. The second stage is “interaction”, where the users are able to contact agencies. For example, users can download forms, fill up and submit forms through online, they can do online registration, etc. The third stage is “transaction”, where customers and users are able to complete online transactions. The fourth stage, “transformation”, consists of integration among internal and external applications for providing full communication among governmental offices and non-governmental institutions.

Layne and Lee [26] developed a four-stage e-government maturity model (2001) which has evolved for monitoring electronic government initiatives in the United States. Their model has four stages. At the first stage of this model, which is known as the “catalogue” stage, the web is presented to the public authority. Here, one-way communication is possible between the government and the governed. The second stage of this model is “transaction”- this stage allows the citizens to interact with the government electronically. In the third stage, “vertical integration”, higher-level systems are involved within similar functionalities. The fourth stage is “Horizontal integration”, various systems of government portals are combined here and this stage is a one-stop service for the citizens.

Hiller and Belanger [27] proposed a model (2001) that has 5 stages. The first stage is information. In this stage, the government simply posts necessary information on their websites. The second stage of this model is “two-way communication”, where the government allows communication between the government and users. In this stage, the users can make online requests and changes. The third stage, “transaction”, involves government websites for the online transaction. People can conduct the complete online transaction through government websites. The fourth stage is “integration”, where all the services are supposed to connect. In this stage, people can access all the services from a single government portal. The fifth stage is “participation”, where citizens are able to vote, conduct registration, post comments online, etc. This stage involves citizens playing the role in forming and changing the government system for betterment. It’s a subset of two-way communication.

United Nations and American Society for Public Administration proposed an e- government model that consists of 5 stages [17]. The five stages of this model are- emerging presence, enhanced presence, interactive presence, transactional presence, and seamless or fully integrated presence. In stage 1, emerging presence, few basic and formal information are presented. In stage 2, the stage of “enhanced presence”, websites provide dynamic and regularly updated information. In stage 3, the stage of interactive presence, users and service providers are able to communicate with each other. Stage 4, transactional presence, allows users to make complete and secure transactions. Stage-5, “seamless or fully integrated presence”, involves a single government website from where users can get easy access to all kinds of gettable services.

We see that all of these models have some similar types of stages like presenting website information, interaction, and transaction. The models have different stage names that perform different types of functions in the models. For example, in Layne and Lees’ [26] model the fourth stage named “vertical integration” presents a one-stop service whether in Hiller and Belangers’ model [27], the fourth stage “integration” and in the United Nations e-government model [17], the fifth stage “Seamless and Fully Integrated Presence” present the same thing. After studying all the models, we have preferred to choose UNs’ five-stage model [17] for our research as we found that it covers all the necessary stages for checking e-government responsiveness.

Countries differ. The way a country follows to implement an efficient e-government system may not work for another country. Hence, it is very important to concentrate on the fact how a specific country can improve its e-government system from its own setting. According to the UNs’ e-government survey of 2022, Denmark ranked 1st, the Republic of Korea ranked 2nd and Estonia ranked 3rd in the EGDI ranking [2]. Denmark’s digitization strategy is focused on building a central ICT infrastructure that connects the national government agencies, local governments, and municipalities to common services and several initiatives, projects, and many other solutions [2]. The Republic of Korea is the global leader in online services provision (OSI) and is the top EGDI performer in Asia [2]. Here, the National Information Resources Service was established to incorporate the information of central government institutions. The Service is responsible for the operation and management of 1,230 digital government services linked to 45 central government institutions and manages about 45,000 government information resources [2]. For digital transformation, Estonia is one of the fastest arousing countries in the world. The citizens of Estonia can do almost everything online except very few things like getting married or buying and selling estates [2]. A multichannel protocol is developed here for the entire online service provision which also secures functions like digital identity, e-voting, e-taxation, etc. [2].

E-government Development Index (EGDI) is biannually presented by the United Nations Department of Economic and Social Affairs (UN DESA) [28]. EGDI is a composite indicator. EGDI consists of 3 indexes- Online Service Index, Telecommunication Index, and Human Capital Index- they are equally weighted. The indexes cover a broad area of components relevant to e-government. EGDI is provided based on a comprehensive survey of online activities of all the 193 countries which are United Nations member states [29]. Mathematically, EGDI is the weighted average of three normalized

scores on three important dimensions of e-government [29] - Online Service Index (OSI), Telecommunication Infrastructure Index (TII), and Human Capital Index (HCI). Online Service Index measures the scope and quality of online services, Telecommunication Infrastructure Index measures the development status of telecommunication infrastructure, and Human Capital Index measures the inherent human capital. Data are collected from various sources for several computations, for example-data collected from an independent Online Service Questionnaire (OSQ), conducted by UNDESA, State Questionnaire (MSQ), etc. [3]. According to United Nations e-government Survey 2020, India and Bhutan have reached to High EGDI level and Nepal has a middle EGDI level [2]. EGDI rank of India, Nepal, and Bhutan are 100, 132, and 103 respectively with the EGDI score of 0.5964, 0.4699, and 0.5777 respectively according to United Nations' e-government 2020 survey [2]. These rankings were 119, 153, and 152 respectively with the EGDI score of 0.3567, 0.2568, and 0.2598 in 2010 [13]. This indicates that the countries have progressed in the last 10 years. The LOSI consists of 80 indicators that are related to four criteria- technology, content provision, services provision, and participation and engagement [2]. The overall LOSI value for a city is the normalized value of the 80 indicators for that city [2]. An Indian city Mumbai has LOSI score of 0.4575, LOSI rank of 33, and Kathmandu (a city in Nepal) has LOSI score of 0.275 and LOSI rank of 59. Mumbai and Kathmandu both belong to the middle LOSI level [2]. The national level indicator does not give a sound picture of the state at the local level and LOSI does the same. To get a sounder picture we decided to analyze the local level units. We have reviewed a total of 36 accessible web pages of the local governments of these countries from July 2021 to April 2022.

Least Developed countries and developing countries face many challenges in implementing e-government systems. Some common problems in the least developed countries are the slow level of progress to create the required telecommunication structure, low income, facing a high level of corruption, a higher digital gap between rural and urban areas in a country, etc. [30]. Seventeen highlighted challenges in the e-government handbook [31] are common between least developed countries and developing countries [30]. The challenges associated with infrastructure development, law and public policy, digital divide, e-literacy, accessibility, trust, privacy, security, transparency, interoperability, records management, permanent availability, and preservation, education and marketing, public/private competition/collaboration, workforce issues, cost structures, benchmarking, etc. [30] [31]. Nepal and Bhutan as the least developed countries [32] and India as a developing country [33] face these challenges.

3 METHODOLOGY

3.1 The model adopted is based on the UNs' 5 stage E-Government model

For our evaluation, we have adopted a 4-stage model containing the first 4 stages of the United Nations E-government model [17]. We chose UNs' model because this model covers all the necessary stages required for evaluating e-government responsiveness and this model is one of the most widely used models. But from this 5-stage model, we have not used the 5th stage ("seamless and fully

integrated presence") because the 5th stage is advanced for the chosen three countries. The 1st four stages of this model are- emerging presence, enhanced presence, interactive presence, and transactional presence. Stage-1, emerging presence presents very basic information about the websites. Stage-2, enhanced presence contains some advanced features, dynamic and specialized information. Stage-3, interactive presence provides an effective way of communication between the users/ citizens and service providers. In stage 4, transactional presence, complete and secured transactions are ensured. For example, providing birth certificates, passports, licenses, various permits, renewing visa, money transactions, etc. are done in this stage. So, our model has a total of 4 stages- stage 1- emerging presence, stage 2- enhanced presence, stage 3- interactive presence, and stage 4- transactional presence.

3.2 The survey questionnaire was adopted from LOSI indicators and Kriyars' Model

The goal of the questionnaire selection was to keep it lightweight. We wanted to find the most significant and appropriate questions for each stage and keep the questionnaire small. This helped us to speed up the scrutiny process. The survey was done by a single surveyor nullifying the bias due to different surveyors. We have used components/ parameters from Kriyars' model [19] and indicators from the LOSI questionnaire [2][18]. Kriyar et al. (2011) used a 4-stage model [24] to assess the local and national level e-government in Indonesia and Cambodia. Kriyars' model has four stages- stage 1- Web Presence, stage 2- Interaction, stage 3- Transaction, and stage 4- Participation. Their first stage, web presence has 4 parameters- web launching, tab about us, contact information, and link to other official pages. The second stage, Interaction has 5 parameters- downloadable forms, publication, email and responses, post comments, and online forums. Stage 3 has 6 parameters- fill out and submit forms, payment transactions, make new passport, renewal visa, birth and death record, and license and permit. Stage 4 has 2 stages- survey, and voting. And the LOSI contains 80 indicators related to four criteria: technology, content provision, services provision, and participation and engagement.

Kriyars' model [19] has a total of 19 parameters and LOSI [18] has a total of 80 indicators. Each of the LOSI indicators is indicated by a question in the Local Government Questionnaire (LGQ) [2][18]. Our model has a total of 23 parameters that are divided into the adopted 4 stages. The parameters have been chosen from the survey questionnaire of LOSI [18] and the parameters of Kriyars' 4-stage model [19]. We have analyzed the parameters/components from these two sources and have chosen the relevant parameters to conduct our evaluation. We do not need to use all the parameters from these sources and so parameters that were not relevant for the current context of the countries were left out. We have surveyed the selected websites to check the presence and absence of the components and features.

We have not used some parameters from Kriyars' model such as making new passports, renewal visas, e-voting, surveys, etc., because features like- making new passports and the renewal visa process are the functions of other sections rather than the 1st level administrative units of these countries. And the participatory activities like- surveys, e-voting, etc. have not been yet initialized

largely in these three countries. Similarly, from LOSI [18], we left some parameters like- the presence of markup validity, compliance with WCAG1.0, questions regarding getting weather updates, budget, information regarding the government bidding process, online data modification options, etc. LOSI [18] [20] questionnaire mainly build for reviewing cities and municipalities. The parameters we left are generally used in the countries' cities' websites and municipalities' websites. As we are reviewing the states, union territories and provinces of India, Nepal, and Bhutan in this research, we have chosen the parameters/ questions that are only relevant to these 1st level administrative units' websites and rest other questions/parameters are left².

There is a total of 36 first level administrative units in India, 7 in Nepal, and 8 in Bhutan. We searched for every website but not all the websites are available³. We have scrutinized all the accessible websites. we have been able to scrutinize 25 websites from India, 4 from Nepal, and 7 from Bhutan. Some of these websites are of the same type and some are different. Some websites contain lots of information, some contain very little information, and some contain a medium amount of information. Based on the website size and contained information, it took different times to examine different websites. We have scrutinized every available part of all the accessible websites. The survey was done multiple times from July 2021 to April 2022 and the latest modifications have been considered in this survey.

The parameters of each stage are described below in Table 1. We have used excel documents for each stage evaluation of each country [34]. In the excel documents, one side (headline row) contains the parameters and another side (headline column/ leftmost column) contains the administrative unit names [34]. Binary digits 1 and 0 have been used for indicating the presence and absence of a particular feature respectively [34].

3.3 Accessibility Rate of the 1st Level Administrative Units of India, Nepal, and Bhutan

India has a total of 36 entities (28 states and 8 union territories) [35] as their 1st level administrative units. Among the 36 entities, we have found the websites of 25 entities. Provinces are the 1st level administrative units in Nepal and Bhutan. Among the 7 provinces of Nepal, we have found the official websites of 4 provinces. The provinces of Bhutan are- Trongsa, Paro, Punakha, Wangdue Phodrang, Daga, Bumthang, Thimphu, Kurtoed (also Kurtoi, Kuru-tod), and Kurmaed (or Kurme, Kuru-mad). Kurtoed and Kurmaed- these 2 provinces are combined into one local administration, so the traditional number of governors is eight [36] though the total number of provinces in Bhutan is 9. Among the available 8 administrative units of Bhutan, we have found the official websites of 7 administrative units- we have not found the official website of Kurtoed and Kurmaed administrative units. Our target was to do a detailed analysis of all the 51 first level administrative units of India, Nepal, and Bhutan but we could access a total of 36 administrative units'

websites. rest of the websites have not been analyzed due to their inaccessibility and unavailability.

The scrutiny was made three times from July 2021 to April 2022 and Table 2 shows the number of websites we have scrutinized at the final stage. Table 2 presents that India has 69% accessible websites of 1st level administrative units, 9 websites have domains but are not accessible, and 2 websites don't have any domain. 57% of provinces' websites are accessible in Nepal and the rest other do not have any domains. Bhutan has 87% accessible websites of its provinces and 1 does not have any domain.

4 FINDINGS OF THE SURVEY

We have reviewed all the accessible 1st level administrative units' websites of India, Nepal, and Bhutan and checked the availability of each component in each stage. Based on the components' total presence, we have assigned scores of components in each stage⁴ [37] and we have shown the graphical presentation in figure 5.

Figure 1 presents the performance of stage-1 (emerging presence) of the 1st level administrative units of India, Nepal, and Bhutan. 8 components (accessibility, about us feature, contact us feature, language, evidence of updates, general news and activities, fast loading time, presence in the first page of search engine) have been considered in this stage. India, Nepal, and Bhutan have 70%, 58%, and 88% accessible websites respectively.

All the accessible 1st level administrative websites of India contain contact us feature, general news and activities, fast loading time and they are present in the 1st page of the search engine. Among the total 1st level administrative units' websites, 23% of websites are presented in both English and local language and 50% websites contain the evidence of updates. Arunchal Pradesh, Bihar, Goa, Kerala, Meghalaya, Nagaland, Rajasthan, Sikkim, Tamil Naddu, Tripura, West Bengal, Andaman and Nicobar Island, Chandigarh, Dadra and Nagar Haveli and Daman and Diu, Delhi, Jammu and Kashmir, Ladhak, Puducherry's official websites are presented in only English. Goa, Himachal Pradesh, Madhya Pradesh, Nagaland, Punjab, Andaman and Nicobar Island, and Ladakh don't contain evidence of updates. 58% of websites of the 1st level administrative units are available and accessible in Nepal. Among the accessible websites, province no 2 and Sudurpashchim province don't contain an about us feature, contact us feature, and evidence of updates. Only Bagmati province is presented in both English and local languages, rest other websites are presented in only Nepals' local languages. 88% of provinces' websites are available and accessible in Bhutan. All the accessible websites are presented in only English language and all of them contain the about us feature, contact us feature, general news, activities. all of them are present on the first page of the search engine and they have a fast-loading time. Except for the Punakha website, all other accessible websites have evidence of updates.

In stage 2, we have 10 components/parameters. They are- Compatibility with Different Web Browsers, Sitemap, Search Feature, Information about the services of the administrative Units, Accessibility through mobile devices, Regular Update, Layout and design, Content, Availability of the links of important official pages, Effective navigation. All the accessible websites of Indian states

²<https://docs.google.com/document/d/1h8Md6dpRTKZAIDcy-rWysmNf1DS1chTd/edit>

³<https://drive.google.com/file/d/1GrISkO10mZAybxKd2Li9oHQ5bnduBkX/view?usp=sharing>

⁴<https://docs.google.com/document/d/1ZJ5rPvEUxzYgfdkuaYomigM4-LgJkS7/edit>

Table 1: Website Maturity Assessment Criteria of Our Model adopted from UNs' 5 Stage model [17]

Maturity Stage	Criteria / components / parameters	Description
Stage-1, Emerging Presence	Accessibility	Some websites have their available domains but are not accessible, so accessibility is an important issue. Websites have to be accessible.
	“About Us” feature	This feature describes about the institution, its activities, history, vision, etc.
	“Contact Us” feature	This feature provides some contact information like email address, phone number, location, etc.
	Language	The webpage should be available in at least 2 suitable languages- one is the English language and another is the local language. The availability of 2 languages helps to provide information and services for diverse people.
	Evidence of Updates	From the evidence of updates, the users become sure of the services' validity.
	General News and Activities	If general news and activities are present on the websites, users get to know about the details of the functions of the websites.
	Fast Loading Time	Loading time is an important factor as people run with time, they require fast services. If a website loads completely within 5 seconds [18], we consider its loading time standard for functioning.
Stage-2, Enhanced Presence	Presence in the First Page of Search Engine	The presence of the website link on the first page of the search engine helps people to easily access the websites to get the correct services.
	Compatibility with different web browsers	Different people prefer different web browsers and so the websites need to be compatible with different web browsers.
	Sitemap	The sitemap provides information about the web pages and other files of the website and their connection. Through sitemap, people are able to get information about the website structure at a glance.
	Search Feature	The search feature helps the users to find required things quickly in their need.
	Information about services of the administrative units	If the information about the services of the administrative units is present, people quickly get to know about the services from the websites.
	Accessibility through mobile devices	People move with cell phones and need to access the services at anytime from anywhere. If they are able to access the websites through mobile devices, they can get instant services from anywhere.
	Regular Update	Websites need to be regularly updated so that users can get updated valid information and services.
	Layout and Design	If a website is fit on various devices without being disrupted and if the layout is consistent between pages, we can say the coding(programming) of the websites layout and design is ok.
	Content	If the website design, color, and texts are clear, concise, and user friendly - we can say that the content is good.
	Availability of Links of Important Official Pages	A website may not provide all the required information needed by the user and so the presence of important official page links is required.
Stage-3, Interactive Presence	Effective Navigation	Cluster free and fast navigation [38] helps to use the websites easily and quickly.
	Online Forms/Registration/Application	For various necessary tasks, people need to fill up the forms. If online forms are available, people can easily fill up the information from home or anywhere.
	Email Interaction	Email is one of the most effective ways of communication, through email interaction, various important messages can be exchanged in effective way.
Stage-4, Transactional Presence	Writing Comments/Feedback	System of writing comments or feedback helps the users to inform their valuable opinions and suggestions to the authorities. And from the users' experiences and suggestions, the authority can update their system in efficient way.
	Transaction of Payment	Through online transaction, people can pay from any place and they don't need to carry cash or hardcopy of the money receipt all the time.
	License/other Permits	System of providing online licenses is an important service which reduce the hassles of the users. Users don't need to do lots of required tasks of the license processing system through online which saves huge time.

Table 2: Number of Available and Accessible Official Websites of 1st Level Administrative Units in India, Nepal, and Bhutan

Country	Number of 1st level Administrative Units	Number of Available Websites	Number of Accessible Websites at the time of scrutiny
India	36	34 (94%)	25 (69%)
Nepal	7	4 (57%)	4 (57%)
Bhutan	8	7 (87%)	7 (87%)
Total	51	45	36

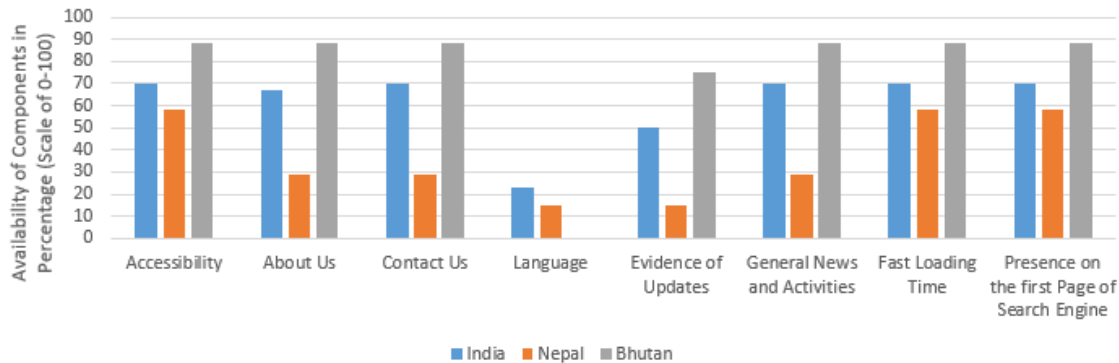


Figure 1: A Comprehensive Look at the local E-Governments at stage 1 (Emerging Presence) in India, Nepal, and Bhutan.

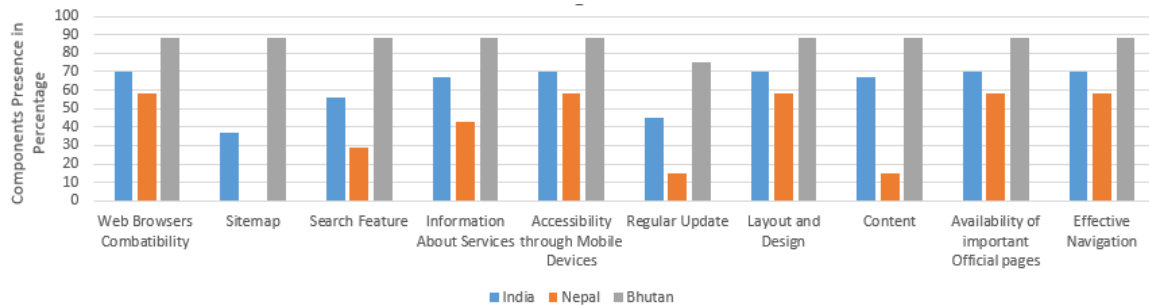


Figure 2: A Comprehensive Look at the Local E-government at Stage 2 (Enhanced Presence) in India, Nepal, and Bhutan.

and union territories are compatible with different web browsers, accessible through mobile devices, their layout and design are user-friendly, and all of them contain important official pages and have an effective navigation system. Among the total 1st level administrative websites of India, 37% contain sitemap, 56% contain search features, 67% have information about services of the administrative units, and 45% websites are updated regularly. Arunchal Pradesh, Bihar, Haryana, Himachal Pradesh, Nagaland, Punjab, Rajasthan, Delhi, Jammu and Kashmir, Ladakh, Lakshadweep, and Puducherry don't contain any sitemap. Arunchal Pradesh, Haryana, Himachal Pradesh, Kerala, Nagaland, Uttar Pradesh, Delhi, Jammu, and Kashmirs' websites are not regularly updated. Arunchal Pradesh, Goa, Punjab, west Bengal, Delhi, and Ladakh don't contain any search options. All the accessible provinces' websites in Nepal are compatible with different web browsers, accessible through mobile devices,

have a user-friendly layout and design, and have links of important official pages. All of their navigation systems are also effective. None of the Nepali provinces' websites contain any sitemap. 43% of them provide information about the services of their units, and 15% are regularly updated. Sudurpashchim province doesn't provide information about their services, only the Bagmati provinces' website is regularly updated. Bhutans' performance is good at stage 2. All of their accessible websites contain all the components in stage 2 except one- and that is the Punakha website (which is not regularly updated).

Stage-3 (Interactive Presence) has 3 components- forms/online applications/ online registration, email interaction and writing comments/feedback. 59% of the Indian states/ union territories websites, all the accessible provinces websites in Bhutan have the option of forms/online application. None of the Nepali provinces contain any option for online forms/applications. 59% Indian, 29% Nepali and

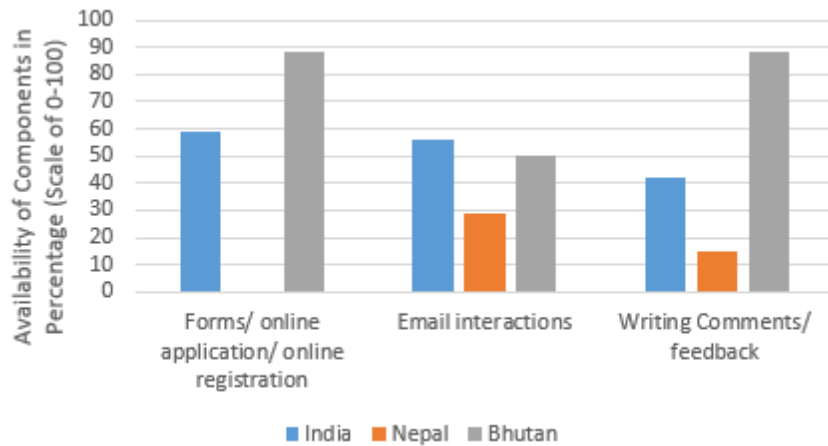


Figure 3: A Comprehensive Look at the Local E-Government at stage 3 (Interactive Presence) in India, Nepal, and Bhutan.

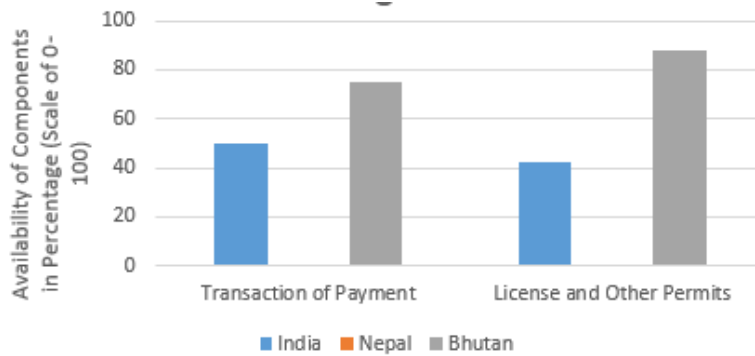


Figure 4: Graphical Representation of Local E-government at stage 4 (Transactional Presence) in India, Nepal, and Bhutan

50% Bhutans’ 1st level administrative units contain email interaction systems. All the accessible provinces of Bhutan contain the option for feedback/writing comments whereas 42% of Indian 1st level administrative units and 15% of Nepali provinces have the feedback/writing comment option. Among Indian states/union territories, Arunchal Pradesh, Haryana, Maharashtra, Uttar Pradesh don’t contain any online form/application system, Madhya Pradesh, Maharastra, Chandigarh, Jammu and Kashmir don’t contain email interaction system, Goa, Himachal Pradesh, Madhya Pradesh, Meghalaya, Nagaland, Rajasthan, Delhi, Jammu and Kashmir, Uttar Pradesh don’t have any feedback/ writing comment section. Nepali provinces’ performance is weak in stage 3. Only Province No 1 and Bagmati Province contain email interaction systems and among the rest other components in this stage, only Bagmati province has the option of providing feedback. And among the provinces of Bhutan-Punakha, Wangdue Phodrang, Daga, and Thimpus websites contain email interactions system.

We have 2 components in stage 4 (Transactional Presence)- transaction of payments, license and other permits. 50% of Indian states and union territories contain transaction of payment systems and 42% of them contain licenses and other permit systems. Among the Indian states/union territories, Goa, Haryana, Himachal Pradesh,

Kerala, Madhya Pradesh, Meghalaya, Nagaland, Punjab, Rajasthan, Sikkim, Tamil Naddu, Tripura, Uttarakhand, West Bengal, Chandigarh, Delhi, Jammu and Kashmir have the system of transaction of payment. And Goa, Himachal Pradesh, Kerala, Madhya Pradesh, Meghalaya, Punjab, Rajasthan, Sikkim, Tamil Naddu, Tripura, Uttarakhand, West Bengal, Chandigarh, Delhi, Ladakh, Lakshadweep have email interaction systems. None of the Nepali provinces have a transaction of payment system or License/other permit systems. Except for Trongsa, all other provinces’ websites in Bhutan have transaction of payment system and all the accessible provinces’ websites in Bhutan provide license/other permits.

These charts from Figures 1–5, indicate that Bhutan’s performance is the best among these 3 countries. Though India and Bhutan are at par with each other, Nepal is distinctly lagging in every stage. 61% of the Indian websites and 75% of Bhutanese websites have features of emerging presence while it is below 40% in Nepal. India and Bhutan both have above 60% and 50% features in the enhanced presence and interactive presence respectively while Nepal has only 39% and nearly 15% in those stages respectively. Even we see that Nepal does not have any features of stage-4 (transactional Presence). India is the largest country among these three and India has much more administrative units than Bhutan and Nepal. Hence the

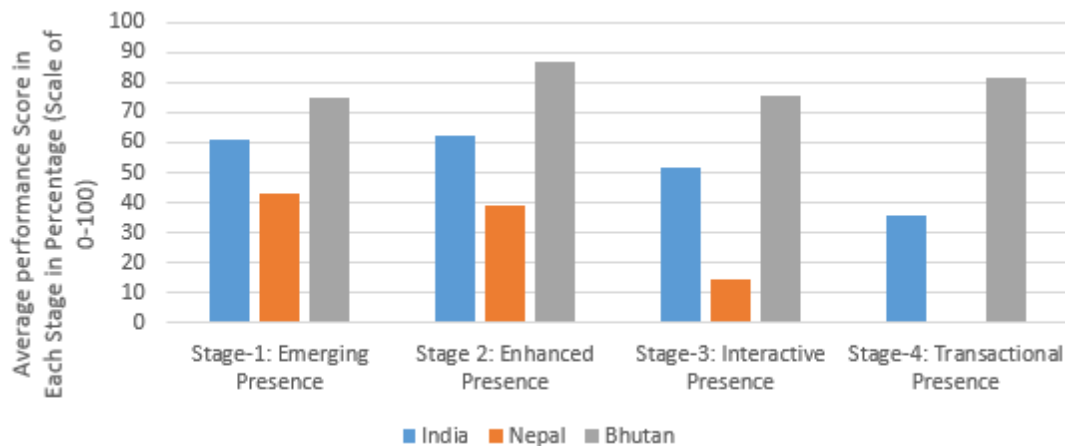


Figure 5: Graphical Representation of local E-government at each stage in India, Nepal, and Bhutan

average performance falls short of Bhutans’ as among 36 1st level administrative units only 25 were accessible in India at the time of the survey. But the accessible and available websites of India are more advanced and effective than those of Bhutan.

5 CONCLUSION AND DISCUSSION

In this paper, we aim to bridge the gap in the assessment of the responsiveness of local government e-governance websites. Although there are number of indicators available to understand the responsiveness at National and representative local levels, there is not much work dedicated to compare among the local governments of a country. Unlike the national governments, local governments are responsible to provide various necessary services to the citizens of their region. Moreover, the local governments dedicated to the states differ from the local governments dedicated to the cities and municipalities. Among all these various types of governments, there are considerable disparities making some states the leaders and some the laggards of innovations in public service, especially in digital transformation. These disparities are only understood if scrutiny is done at the local government level of a country.

Here we conduct a comparative study among 1st level administrative units of India, Nepal, and Bhutan. The uniqueness of these three countries helps us to understand e-government responsiveness in three types of countries - 1. Regional economic power hub, populous, diverse, open, and trading country (India), 2. Mid-level economically developed at the regional level, populous, open, landlocked (therefore dependent bordering country for any trade) country (Nepal), 3. Mid-level economically developed at the regional level, less populous, closed, and landlocked (therefore dependent bordering country for any trade) country (Bhutan).

A four-stage model adopted from UNs’ five-stage model [17] was used to evaluate the 36 accessible (25 from India, 4 from Nepal, and 7 from Bhutan) webpages of the 1st level administrative units in India, Nepal, and Bhutan. A unique questionnaire was adopted from Kriyars’ four-stage model [19] and LOSI [18].

Our research show that, even though India, Nepal, and Bhutan have improved in the EGDI indicators over the years, considerable

disparity exists among 1st level administrative units of each country. Among the three, Bhutan fares the best, followed by India and then Nepal. The sheer number and size of Indias’ administrative units outpace those of Bhutan and hence at the percentage level Bhutan is doing very well but this does not portray the vast number of challenges encountered by India. However, there are several commonalities. None of these countries are successfully conducting online voting and other participatory activities. All of the countries have accessibility issues as many of the websites were not navigable at the time of the scrutiny. We recommend some additions and modifications in the websites and government systems for south Asian countries to ensure the proper implementation of e-government systems. We recommend some suggestions below and hope that the governments of these 3 countries will be benefitted from their e-government implementation if they consider the following facts-

- Countries need to take initiative to ensure the availability and accessibility of the websites.
- Websites of Nepal’s 1st level administrative units’ performance scores for emerging presence, enhanced presence, interactive presence, and transactional presence are 43%, 39%, 14.67%, and 0% respectively. 1st level administrative units’ websites of Nepal need to add more services in all 4 stages.
- Available websites of Bhutan and India are good at all stages. Their performance of the available websites is appreciable. Still, many of the websites lack many important features. All the 1st level administrative units’ websites need to be created and ensured to add all the basic features of the 4 stages of this e-government model.
- The countries can involve software testers to check whether all the required websites are accessible and have all the necessary features. If the tester reports the lacking, it will help the developers to develop the websites effectively.
- All the websites may consider having at least 2 languages-one is in English (as an international language) and another is in their preferred local language.

- Government can encourage people to use information technology with online systems, and train them with appropriate trainers.
- The countries' national and local websites can be compared with the leading countries' websites so that the countries can move forward and cope with the modern world.
- Institutional mechanism to ensure the presence of trained people for digital transformation at the supply size should be a priority.
- On the demand side, to make the users more capable of using the services, local governments may take measures to educate the inhabitants regarding the use of various ICT tools.

This paper is limited to the assessment of the 1st level administrative units. Hence the research is not comprehensive enough to comment on the state-of-the-art of websites in various administrative units of the local governments (primary, secondary, tertiary, and so on). However, the model and questionnaire were adopted to cater to the conditions of the developing world and have the potential to be replicated by other countries of the global south.

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