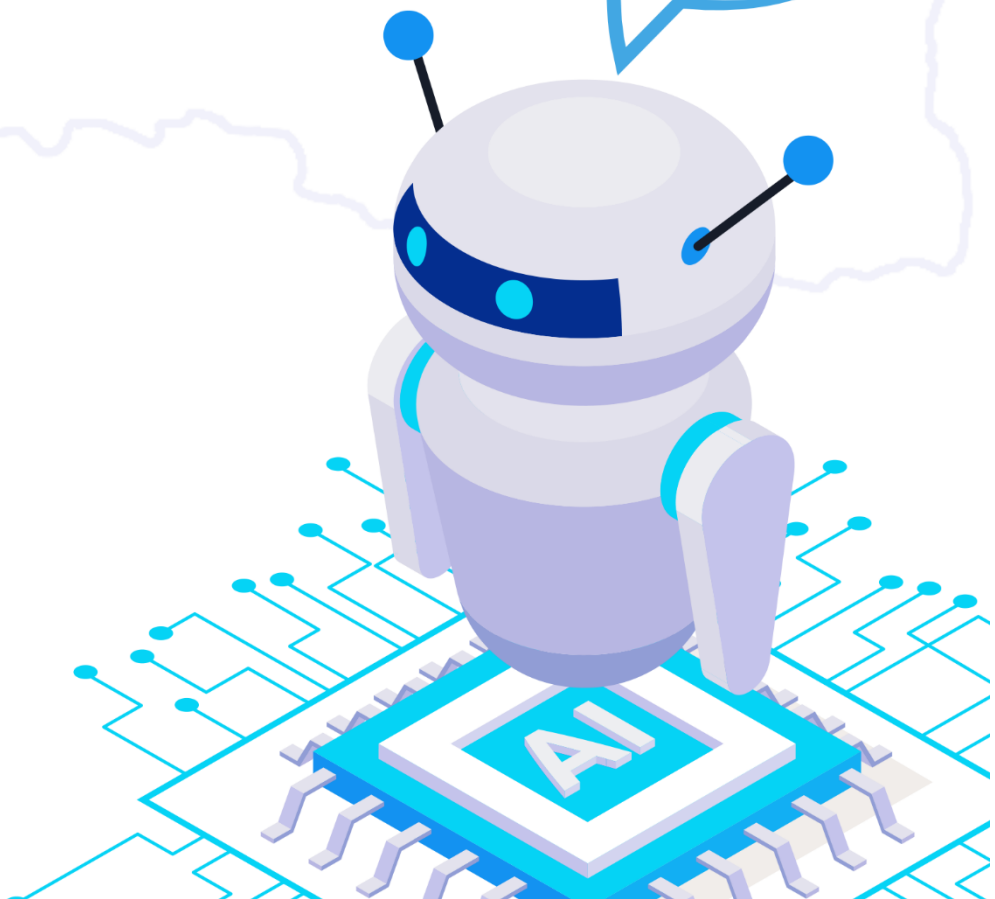


ASSESSING THE NEED AND
FEASIBILITY OF CHATBOT
IMPLEMENTATION FOR
IMPROVING
GOVERNMENT-TO-PUBLIC
INFORMATION
DISSEMINATION IN NEPAL

नमस्ते



2023

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Executive Summary

Nepal Government is on journey of digital transformation and has adopted Digital Nepal Framework to mainstream digital services to boost good governance digitally. In October 2019, Nepal government came up with a Digital Nepal Framework, outlining one nation, eight sectors and 80 digital initiatives. This framework prioritizes a fiber broadband network, 5G and a special economic zone for the IT sector to mainstream digitization in Nepal. The framework is also expected to contribute in achieving the Sustainable Development Goals (SDGs) set by the United Nations, besides supporting the government's goal of achieving good governance. In the context of Nepal, good governance is crucial for promoting economic growth, reducing corruption, and improving the quality of life for citizens. There has also been a growing demand for digital services from the government in Nepal. Citizens now expect the government to provide convenient, efficient, and accessible services through digital platform. There is need of one common platform that can foster the knowledge and access of public in relation to government and its services. To address this issue, a study was conducted to determine the feasibility of chatbots in government services by NAAMII and DIYO.AI. The study aimed to discover how we can improve the efficiency and accessibility of government services for citizens, in line with the principles of good governance. The study was based on a survey of 15 local governments, a desk study of relevant reports, and a key informant interview with the relevant government bodies using questionnaires developed by UNDP accelerator Lab, NAAMII, and DIYO.AI. The survey was carried out with the help of KOBO Collect tool and targeted government offices and local government were selected based upon internet coverage, presence of IT officers, and use of online services. The survey aimed to gather information about the digital capacity, transformation, knowledge, willingness and needs of public and government bodies, and to access the parameters crucial for chatbot installation such as mobile availability and internet access.

The study found that a majority of respondents (71.43%) indicated that they would probably like to develop chatbots with other support systems, while 35.71% definitely would like to develop them themselves. In terms of personnel allocation for managing chatbots, 50% of respondents indicated that it is possible to allocate a person, while 21.43% indicated that it is definitely possible. With regards to funding for the operational costs of chatbots, 57.14% of respondents indicated that they possibly would agree to pay the costs. The findings suggest that there is a need for chatbot installation in government bodies in Nepal, as it can improve the accessibility and efficiency of government services for citizens. However, further measures need to be taken to address the technical and financial capacity for chatbot installation. The study is expected to contribute to the development of a sustainable strategy for chatbot installation in government bodies in Nepal

Based on the results of the survey and analysis of secondary sources of information, the study concluded that there is a need for chatbots in government services within Nepal. The chatbots can provide citizens with information on various government services, such as benefits, taxes, and immigration, as well as government policies and procedures. Chatbots can also be used to provide citizens with information on their rights, such as the right to information and the right to access government services.

1 Introduction

1.1 Background

Data Management and Good Governance

Data management and good governance have become increasingly important in recent years, particularly with the rapid growth of digital technologies. With the advancement of technology, data management has become an essential component of government operations and decision-making. Technology has played a significant role in improving the quality of governance and data management in various countries. Data management refers to the process of organizing, maintaining, and utilizing data effectively. In Nepal, data management is crucial for ensuring good governance and transparency in decision-making processes. The good governance is a situation where there is a mutual trust between the state and the citizen (Ali, 2020, p. 70) and their interaction and interrelation. Good governance reflects effective and transparent management of a country's resources and affairs. In the context of Nepal, good governance is crucial for promoting economic growth, reducing corruption, and improving the quality of life for citizens. There has also been a growing demand for digital services from the government in Nepal. Citizens expect the government to provide convenient, efficient, and accessible services.

Research and studies on Data Management and Good Governance

A study by Adhikari et al. (2015) explores the relationship between good governance and public service delivery in Nepal. The authors found that lack of good governance has led to corruption, inefficiency, and a lack of accountability in the delivery of public services. The authors argue that good governance practices, such as transparency, accountability, and participation, are essential in ensuring that the government's programs and services are delivered effectively. A study by Bhattarai (2017) examines the need for digital services in the public service sector in Nepal. The author found that digital services have the potential to improve the delivery of public services, by reducing corruption, increasing transparency, and improving efficiency. The author argues that the government should invest in digital services to meet the changing needs of citizens and to ensure that public services are delivered effectively.

In 2018, a study titled "Study of Development Data in Nepal" was conducted by Bikash Udhyami (Bikash Udhyami, 2018) which majorly highlights the status of and need for data management in Nepal. The use of data and information is identified both inside and outside government. Nepal's National statistical system is highly fragmented and coordination between data producers has been very difficult. Nepal's legal framework provides access to information but don't provide clear way for data sharing. Government agencies still adhere to traditional data distribution methods for making data public. Access of information, affordability, Cyber security, digitization of content, synergy between overall infrastructure and three levels of government are the key existing issues in data sector. In December 2019, the World Bank published a report titled "Nepal Development Update" with a focus on "Envisioning a Future Data Ecosystem in Federal Nepal". The report highlights the importance of data management and data ecosystem in the successful implementation of federalism and acceleration of development progress in Nepal. The global data

revolution is driven by the ability to collect, store, share, and analyze data digitally, which Nepal's data ecosystem must also embrace. The focus in Nepal has been primarily on data production, but without improvement in data sharing and use, new data will not contribute much to the ecosystem. A strong coordination mechanism is needed to avoid duplications and ensure responsibilities are clear across government agencies, the private sector, civil society, media, academia, and development partners. The data needs of local governments are diverse and there is a need for more and better data to meet the demands of the Sustainable Development Goals and local development challenges. The recommendations in the report are centered around making the most of existing data and focusing on short-term priorities.

The Development Initiative published a report in March 2021, called "Nepal's evolving data community," as part of the Data for Development initiative. The report highlights the need for better quality, accessible and disaggregated data for provincial and local governments to make informed decisions and meet the needs of their communities. There is also a growing need for citizens, civil society, media, and the private sector to have access to data-driven evidence. However, despite the increasing availability of alternative sources of data, official data still faces limitations in availability, accessibility, and usability. There is a lack of unique identifiers, up-to-date data, and concerns about data accuracy. The growing digitization of government systems and services will lead to improvements in access to information for some, but exacerbate the digital divide for those without access. The demand for data has increased, although not specifically for open data.

Chatbot in data management and good governance

Chatbots have become an increasingly popular tool for businesses and organizations to improve customer service and streamline communication. Chatbots, also known as virtual assistants, use Artificial Intelligence (AI) to understand and respond to user queries in natural language, making them an ideal tool for answering frequently asked questions, guiding users or customers to use particular service and providing information to citizens. With the increasing use of technology in daily life, it has become imperative to use AI-based chatbots as a tool for providing information and assistance to citizens.

In the global realm, chatbots have been implemented in government service delivery in countries such as Singapore, United Kingdom, and United States. In Singapore, the government has implemented a chatbot named ¹"Ask Jamie" to provide citizens with information on government services and policies. In the United Kingdom, the government has implemented a chatbot named ²"GOV.UK" to provide citizens with information on various government services, including benefits, taxes, and immigration. In the United States, the government has implemented a chatbot named ³"USCIS" to provide citizens with information on immigration services. These examples demonstrate the potential of chatbots to improve government service delivery and make it more accessible to citizens. Research has shown that chatbots can be a cost-effective and efficient means of providing customer service in government organizations. For example, a study by the World

¹ <https://isomerpages-template.netlify.app/products-and-services/ask-jamie/>

² <https://www.gov.uk/guidance/using-chatbots-and-webchat-tools>

³ <https://www.uscis.gov/tools/meet-emma-our-virtual-assistant>

Bank found that chatbots can reduce the cost of providing customer service by up to 30%. The study also highlighted that the implementation of chatbots can lead to a reduction in the number of face-to-face interactions and phone calls to government agencies, which can help to reduce the workload for government employees. Additionally, a study by the United Nations Development Programme found that chatbots can improve the efficiency of service delivery by up to 50%. Another study by McKinsey & Company found that chatbots can improve the efficiency of government service delivery by up to 30%.

Chatbot and its relevance in Nepal

In Nepal, the implementation of chatbot technology in government service delivery aligns with the constitutional right to information and the policy on good governance. Nepal has also adopted Digital Nepal Framework which highlights the need of digital transformation in priority areas to contribute to SDG's as well. 'Procedures for the Use of Social Media by Government Agencies 2075' also clearly states that in order to make information and public services more accessible and effective to public, government of Nepal can start its own public interaction platforms other than the websites and social media accounts. The need for chatbot technology in government service delivery has been widely recognized in recent years as a way to improve governance and information accessibility for citizens. ⁴Nepal Telecom, ⁵Department of Information Technology, ⁶Kathmandu Municipality are only pioneer government entities till now for installing chatbots. Although, these institutions have piloted chatbot in their systems but they haven't been much effective in areas of availability of the information related to public interest. These chatbots have been integrated in their respective website and lack language processing in romanized script as well. Various private companies like Yeti Airlines, Helmets Nepal, Herveda etc have installed chatbots to foster their business and have positive response on improvement of service delivery by them.

The scope of chatbots in government service delivery in Nepal may include providing information on various services, such as benefits, taxes, and immigration, as well as information on government policies and procedures. They can also be utilized to inform citizens about their rights, such as the right to information and access to government services. Research has shown that chatbots can play a significant role in improving data management in the country. For example, in a study by Shrestha et al. (2021), the authors found that chatbots can be used to automate data collection processes, reducing the time and resources required for manual data collection. Research has shown that chatbots can play a role in promoting good governance by providing citizens with access to information and services.

Research Organization

The organization leading this research, NAAMII, is a reputable research organization in AI with a history of successful research projects and grants from reputable organizations. The team at NAAMII is comprised of experienced research scientists from top research labs around the world.

⁴ <https://www.ntc.net.np/>

⁵ <https://doit.gov.np/>

⁶ <https://kathmandu.gov.np/?lang=en>

The team at NAAMII has a proven track record in this field, with members having won international chatbot competitions and successfully developing Nepali open query chatbots with thousands of users. DIYO.AI has been incubated by NAAMII to work on the technical aspects of developing chatbot and deploying it. Some of the successful bots developed by both organizations include Golu with >12K likes in Messenger [4], an open domain chatbot that is able to understand and respond to a wide range of queries on various subjects in both English and Nepali (in both Devanagari and Romanized script) and COVID-19 emergency chatbot in a Viber group with more than 80K subscribers that enables public to ask covid-19 related question ie symptoms, safety procedure, government services like vaccination, ambulance, blood supply etc in both Devanagari and Romanized script.

1.2 Problem Statement

The Central Bureau of Statistics (CBS) is the sole authorized custodian for overall national data management in Nepal and is responsible for the national statistical system and official statistical activities for government agencies. Besides there are various policies, legislations and directives that can be exercised by various government entities for managing data in various forms and for various use to promote good governance. However, these produced information, results aren't easily accessible to public in a reliable and feasible way. Lack of proper two-way communication between service provider and general public has created gap in information management as well as addressing the right to information.

Digitalization has been a priority in many government agencies at different level. The Ministry of Communications and Information Technology issued a 'Directive Related to Development and Management of Website of Government Offices, 2021' exercising the powers conferred by Section 45 of the Good Governance (Management and Operation) Act, 2006. This clearly outlines the need to bring uniformity in government web portal with inclusion of basic parameters like policy and legal provisions of services to delivered by the office; details of services that the office provides to citizens and other relevant official information.⁷As of now, all local and provincial government have completed website development. To also go on with new forms of communication platforms and social media, Nepal Government came up with 'Procedures for the Use of Social Media by Government Agencies 2075'. This procedure outlines the need for government bodies to have active presence on social media like Facebook, Twitter and Viber. Through these platforms, government can work on information dissemination, public service delivery and grievance handling. However, there is no one digital space where public can enquire about all required information. Government has developed many online portals and websites, but these platforms aren't user centric and are difficult to navigate. There isn't system that enables user to have 24/7 enquiry service and are moreover available during the office time only. One study by Shrestha (2020) found that there is a lack of transparency and accountability in government decision-making, which leads to a mistrust among citizens and hinders effective communication between the government and the public. Another study by Pradhan (2019) highlighted that the government agencies in Nepal often do not share data and information with citizens, which can lead to a lack

⁷ <https://sthaniya.gov.np/gis/website/>

of participation in public policy development and implementation. Furthermore, a study by Central Bureau of Statistics (2017) found that despite the government's efforts to improve data accessibility, there are still challenges in terms of data availability, quality, and dissemination, which can affect the flow of information between government and public.

The focus of this study is on developing better understanding of the context and feasibility for development of conversational AI and chatbots that supports native Nepali language. This is particularly important in the context of Nepal as it is a multilingual country and it is essential for government services to be accessible to all citizens, regardless of their language proficiency. This study aims to investigate the potential for the development and implementation of chatbots in government services, with a focus on providing information and support for government policies and procedures, as well as assist government services like obtaining permits and licenses. The study also examines the current status of data management in Nepal and the feasibility of integrating chatbots. The objective is also to find a way on how to enhance the efficiency and accessibility of government services for citizens, in accordance with the principles of good governance. The study aims to provide recommendations for potential government bodies that can introduce chatbots into their system.

1.3 Objective

The study was conducted with overall objective of determining feasibility for chatbot installation in government bodies within Nepal. It includes critical analysis of current e-service delivery and capacity in technical, operational and financial terms of government bodies. Public from the respective local government also have to be inquired for their capacity on use of technologies, accessibilities to online platforms along with what are their experience and expectations in digital services and e-governance. For this following specific objectives have been set forth

- Gather information about digital capacity, transformation, knowledge and need of public and government bodies.
- Access the basic parameters like mobile availability, internet access and perception of all concerned stakeholders which are crucial for Chatbot installation. Collect information about the technical and financial capacity of public service providers for chatbot installation.

1.4 Limitations

This research was conducted through selection of few representative government bodies as per the need of the project and maynot reflect the overall scenario of all government entities. We were unable to cover perspective of all selected local government officials and local representatives due to their unavailability and other issues like lack of interest/unwillingness to provide relevant information to the study.

2. Research Methodology

The research was concluded with both field based research through questionnaire survey and analysis of relevant secondary sources of information. The research can be explained in following steps

2.1 Sample Size Design

Specific selection criteria were used for each site, considering internet coverage ranging from maximum 100% of the area to minimum 40%. The focus was also on municipalities that have IT officers and are proven to use online service systems for news/notice dissemination, as well as those with and without online services for financial transactions like billing for electricity, payment of school fees, e-banking services, and e-commerce. For rural municipalities, priority was given to those using less online systems and less internet (max 40% users in retrospect to population). For this information we did discussion meeting with PLGSP. After the sampling process, 15 local governments were selected for the study in Nepal. These include Butwal Sub Metropolitan City, Bharatpur Metropolitan, Gajuri Rural Municipality, Ratnanagar municipality, Bhojpur Municipality, Galyang Municipality, Satyawari Rural Municipality, Gurdakot Municipality, Chandragiri Municipality, Nijgadh Municipality, Budhanilkantha Municipality, Nepalgunj Sub metropolitan City, Tokha Municipality, Pokhara metropolitan city, and Lalitpur Metropolitan City. In addition, the study also included surveys of the National Information Commission, Department of Information and Technology, and Ministry of Labor, Employment and Social Security.

The selection process was designed to ensure that the 15 selected sites are representative of the diverse local governments in Nepal. Surveys were conducted at each of the 15 selected sites, with a total of 50 individual participants per site. Participants from different age groups were included, with 14 participants aged 18 to 28, 19 participants aged 28 to 48, 14 participants aged 48 to 60, and 3 participants aged 60 and above. Additionally, one IT officer from each local government and one government personnel at each site were surveyed to provide a well-rounded understanding of the opinions and experiences of both the general public and government personnel regarding online services and chatbots.

2.2 Questionnaire Formulation and Testing

For this study, we designed a structured, individual, quantitative self-administered survey. The survey aimed to identify the agencies where chatbots should be developed, how our chatbot will be integrated and operational, and to find out the possibility of using a chatbot by the general public.

We conducted three different surveys, each with a different focus:

1. Existing Technical infrastructure and additional requirements for implementing chatbot
2. Modes and experience of General public in interaction with government organizations with their technical awareness.
3. Perception of government personnel for sharing information and chatbot technology.

To ensure the effectiveness of our survey, we tested the questionnaire before conducting the actual survey. We conducted a pilot study with a small group of individuals to assess the clarity and validity of the questions. Based on the feedback received, we made necessary adjustments to the questionnaire to ensure that the survey questions were clear and easy to understand. The final survey questions were then used for data collection.

In context of the data from government body, desk study of the reports published by similar studies on data management and governance was also carried. There has been studies by researchers and various institutes in Nepal relating to data management after federalism which has been referenced for the report generation. Total of 15 local government were surveyed based upon the questionnaires developed for survey while Key Informant Interview with Department of Information Technology, Ministry of Labor, Employment and social security was carried based upon the checklist of information required for chatbot installation, information and data management and good governance. The report has been prepared based upon the results of the survey and as well through analysis of secondary sources of information which are kept in references.

2.3 Analysis and Report Preparation

Based on the structured, individual, quantitative self-administered surveys, data was collected using KoBoToolbox. The collected data was then analyzed using Excel, which included the normalization technique to ensure accuracy. The results were presented in a clear and concise manner, utilizing infographics to provide visual representation of the findings.

3 Data Analysis and Discussion

3.1 General Public

1. Demographic data:

Upon data collection from a total of 550 respondents, analysis of the presented diagram indicates that 58.2% of the sample were male respondents, while female respondents accounted for 41.8% of the sample. The dominant age group includes 31.31% of 18 to 28 years followed by 27.78% of 28 to 48, 25.76% of 48 to 60 and remaining of above 60 group years old. Out of all public respondents, 24.1% had education under 10+2, 30% had completed 10+2 education, 35.7% held a Bachelor's (undergraduate) degree, and the remaining 10.2% had a Master's degree or higher education.

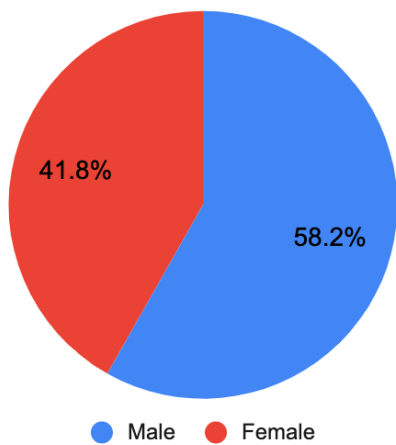


Figure 1 Gender Composition

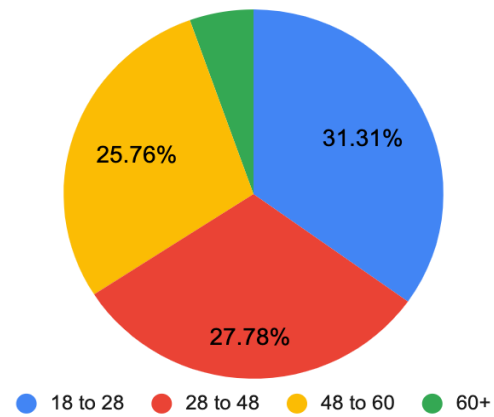


Figure 2 Age Composition

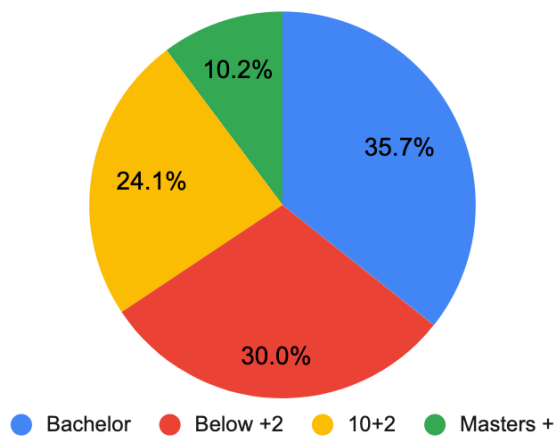


Figure 3 Education Status

2. Interaction of Public with Government offices

Based on the survey results, it is clear that the majority of respondents utilized services related to obtaining certificates, with Citizenship Certificate being the most frequently used service at 94.95%. The second most popular service was obtaining a Marriage Certificate at 56.76%. The need for obtaining a National ID Card (54.41%) and Driver's License (49.19%) was also prominent among the respondents. In comparison, services such as obtaining a Voter Card (1.62%), Land Ownership Certificate (0.54%), and Property Document (0.18%) were less frequently used. A significant portion of respondents utilized the service of Company Registration (8.65%), while a smaller percentage utilized the service of Senior Allowance (4.50%).

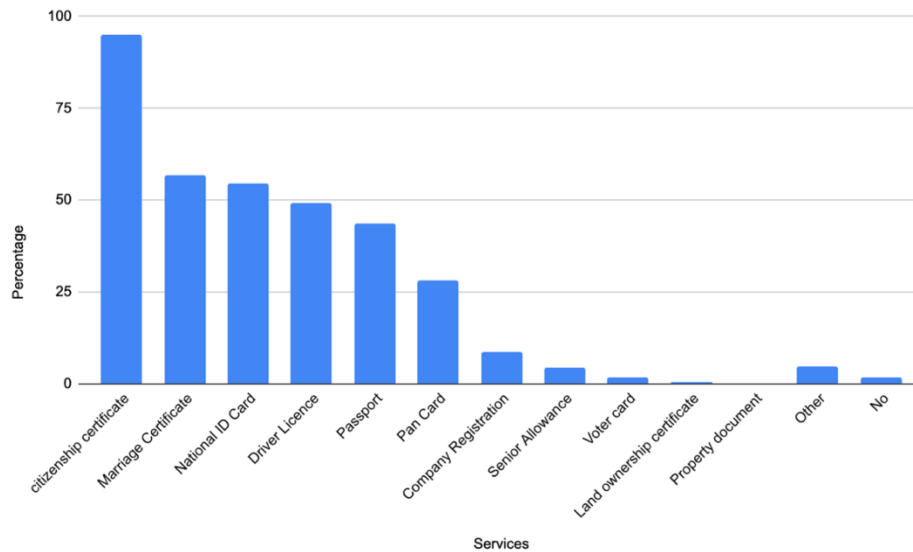


Figure 4 Comparison of government services

The survey also investigated the frequency with which respondents searched for information about the services before visiting the government office. It was found that 47.62% of respondents searched for information sometimes, while 28.57% almost always searched for information beforehand. A smaller proportion of respondents, 14.29%, never searched for information, and 9.52% seldom searched for information. These results suggest that the majority of respondents prioritize gathering information before visiting the government office, with nearly 76% either sometimes or almost always conducting research beforehand.

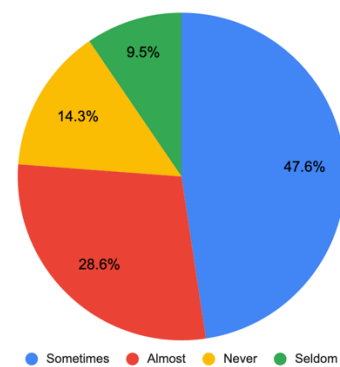


Figure 5 Frequency of information outreach

Among those who sought information through both online and offline means, 48.17% reported that the information they obtained was incomplete.

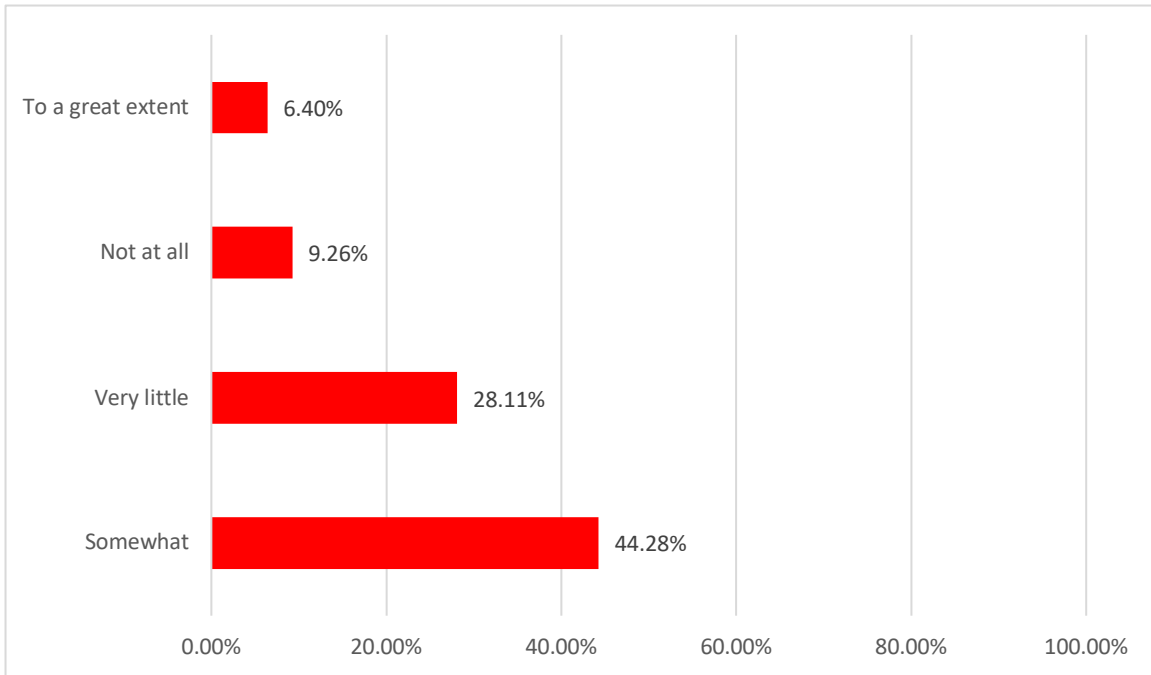
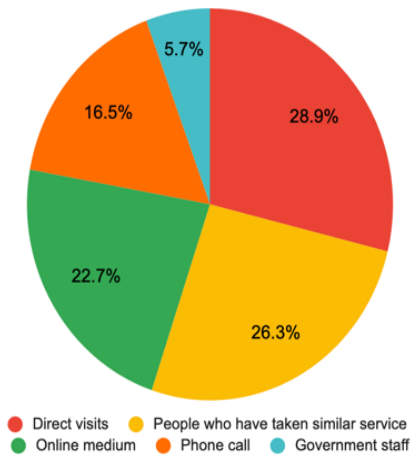


Figure 6 Usefulness of the information by Public



The survey also looked into the medium used by respondents to receive information about government services. Results showed that the most common method of obtaining information was through direct visits to the government office at 28.87%. People who had previously taken similar services (26.29%) and online medium (22.68%) were also frequently used sources of information. Information obtained through phone calls (16.49%) and government staff (5.67%) was less frequently used as a source of information.

Figure 7 Medium for Obtaining Information

3. Interaction of public with government through phone call

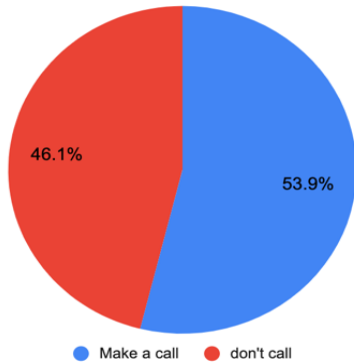


Figure 9 Tendency of Public to Call

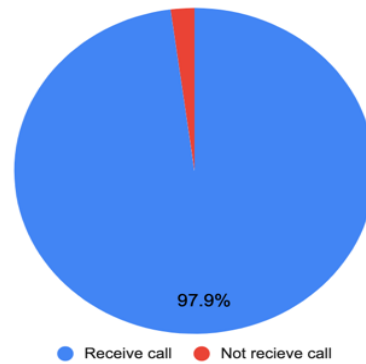


Figure 8 Tendency of government towards public call

While investigating people's interaction with government services through mobile phone usage, we found that 46% of respondents have no tendency to call government offices. Among those who do make calls, the tendency of receiving a response was found to be around 97%.

Regarding the experience of interacting with government services through phone calls, 51.39% of respondents reported of having negative experience (frustrating and unsatisfactory). However 48.61% respondents reported positive experience (acceptable and good).

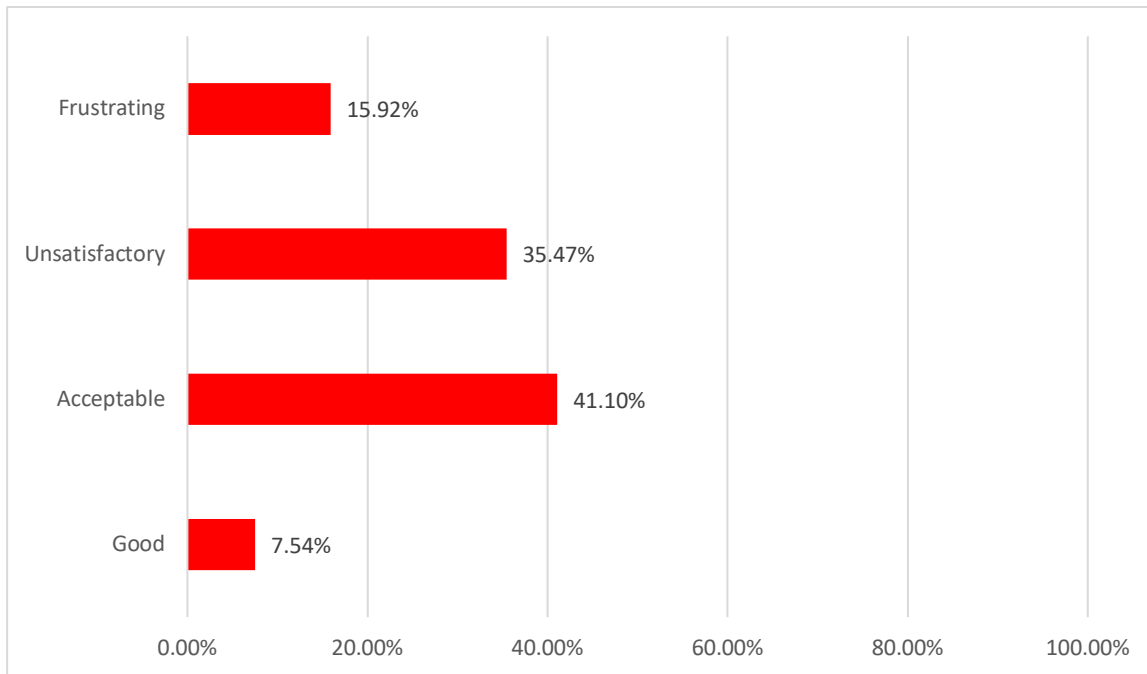


Figure 10 Experience of public regarding government interaction

The survey also revealed that the information obtained through phone calls was found to be satisfactory and applicable when visiting government offices in person.

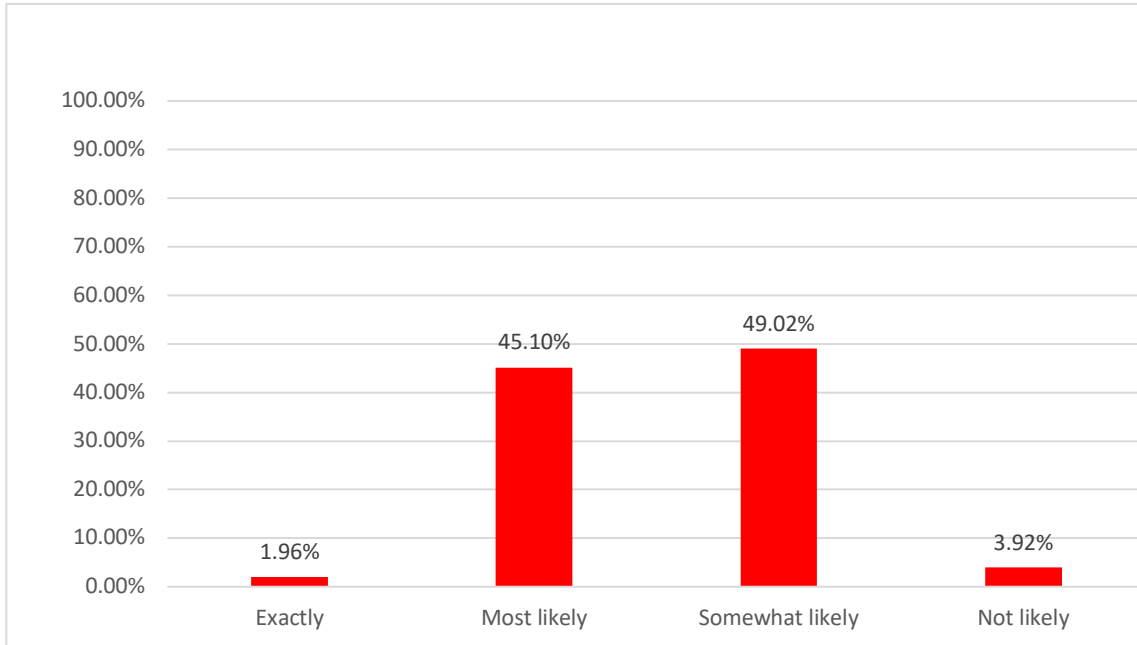
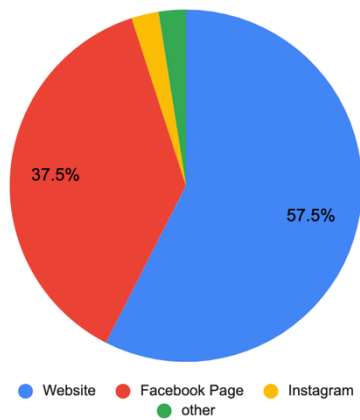


Figure 11 Usefulness of information

Figure 12 Experience regarding required information through phone call

4. Digitally government service delivery

To improve communication and access to information, the government of Nepal has adopted various online mediums to share information and receive queries. Our study found that 75% of respondents were familiar with the term "e-commerce".



The survey also evaluated the most commonly used channels to receive information about government services. The results showed that the majority of respondents, 57.5%, relied on the government's website as their primary source of information. A significant proportion of respondents, 37.5%, utilized the government's Facebook page as their source of information. Instagram (2.5%) and other channels (2.5%) were not frequently used as sources of information.

Figure 13 Digital Information Sources of government

5. Utilization of Digital Platforms and Mobile Applications by the General Public

The data presented indicates that 100% of the population we surveyed uses mobile phones, while only 50.41% of the population uses the internet through mobile phone.

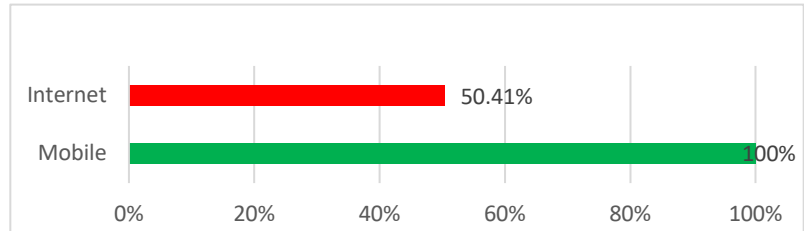


Figure 14 Mobile and Internet Coverage

The survey results on online activities showed that 11.18% of respondents reported taking online classes sometimes (occasionally), 8.94% reported taking them often repeatedly), and 10.98% reported always taking them. This shows a growing trend towards the use of online learning platforms, pointing to potential for further growth in this sector. In a similar way, 17.89% of respondents reported sometimes paying bills online, 13.01% often, and 18.29% always. This trend indicates an increasing preference for digital payment options, which could result in further growth opportunities in this field. This data indicates that while a majority of people are using technology for these tasks, there is still a significant portion of the population who have not yet adopted technology for these services.

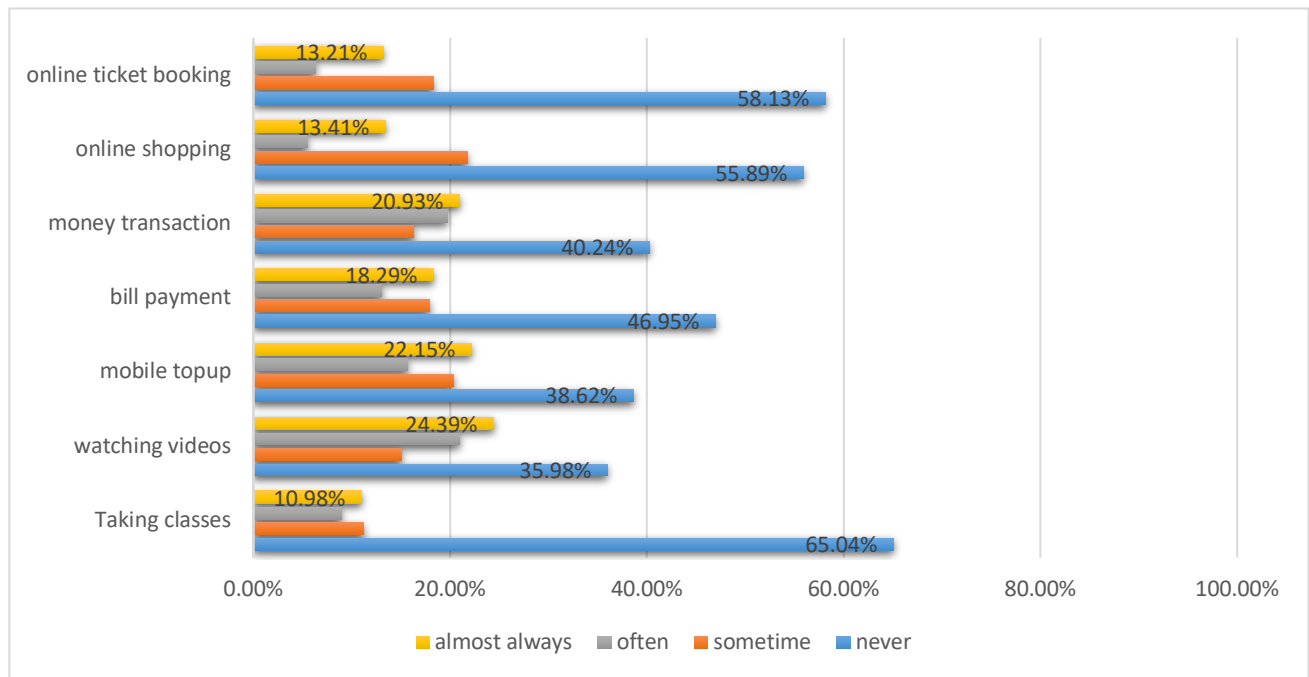


Figure 15 Internet Utilities by Public

They study found that various apps are being used by the Nepalese population for different purposes. YouTube, Facebook, Instagram, Twitter, and TikTok are some of the most popular apps among the Nepalese population. According to the survey data, 89.9% of the Nepalese population is using YouTube, 91.5% is using Facebook, 47.9% is using Instagram, 26.9% is using Twitter, and 59.9% is using TikTok. These

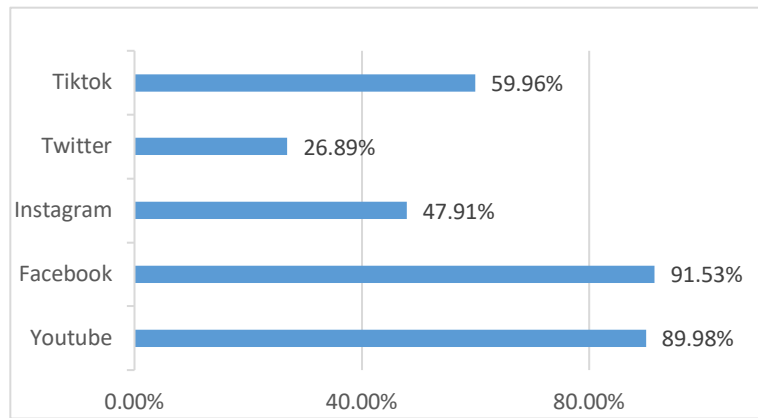


Figure 16 Popular Social Media Platforms among public

figures indicate that the majority of the Nepalese population is regularly using these apps. Social media apps such as Facebook, Instagram, and Twitter are among the most widely used, as they enable users to stay connected with friends and family and access a variety of content. TikTok is also gaining popularity, as it allows users to create and share short videos.

In addition to social media and video streaming apps, instant messaging apps other than Facebook Messenger have also seen a significant increase in usage among the Nepalese population. Our survey found that Viber, WhatsApp, Telegram, Emo, and Snapchat are among the most popular instant messaging apps used in Nepal. According to the survey data, 44% of the population uses Viber, 62.7% uses WhatsApp, 16.9% uses Telegram, 3.4% uses Emo, and 27.6% uses Snapchat.

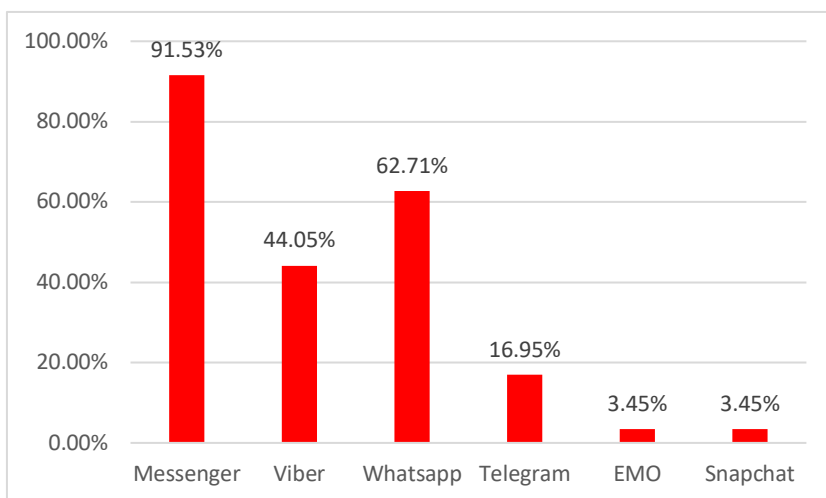


Figure 17 Instant Messaging Platforms usage

These numbers indicate that majority of the population is using instant messaging apps to communicate with friends, family, and even in business. It is also worth noting that the trend of instant messaging is on the rise in Nepal, with a growing number of people turning to these apps as a convenient and efficient way to communicate.

In addition to the popular global apps being used by the Nepalese population, it is worth noting the success of locally developed apps in the country. Our survey found that Nepalese fintech apps, such as Esewa, Khalti, IMEPay and ConnectIps, are gaining significant traction among users. These apps provide a convenient and efficient way for users to manage their finances, make online payments and perform other financial tasks from their mobile devices.

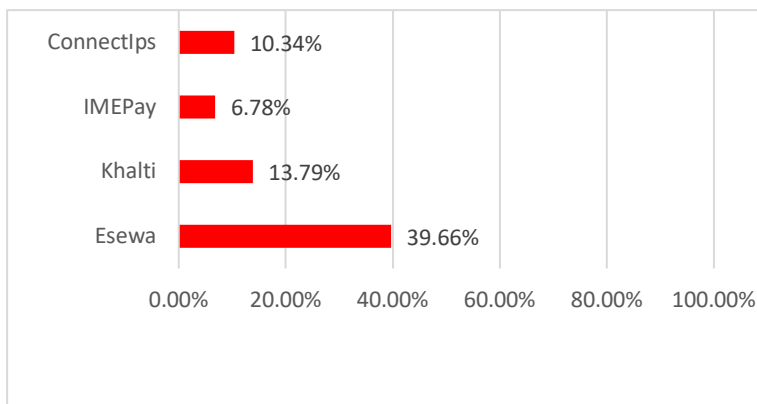


Figure 18 Digital Payment Apps and their usage

According to the survey data, 39.7% of the respondents are using Esewa, 13.8% is using Khalti, 6.8% is using IMEPay and 10.3% is using ConnectIps. These numbers indicate that a significant portion of the Nepalese population is using these locally developed apps on a regular basis.

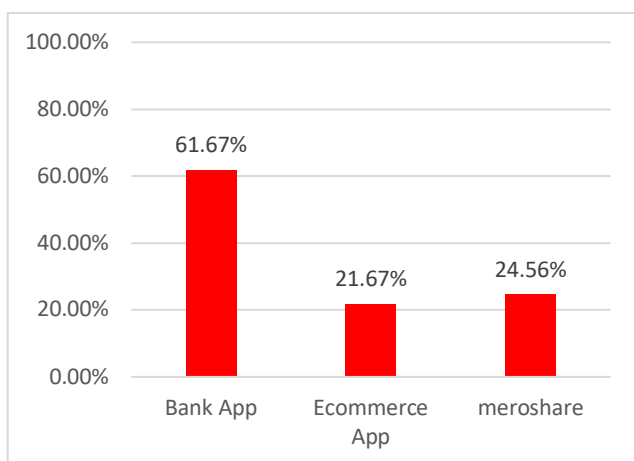


Figure 19 Usage of utility apps

This highlights the growing potential and capabilities of the Nepalese IT industry, not only as adopters of technology, but also as developers and innovators in their own right. Furthermore, the survey also indicates that the population is also using different types of apps such as bank apps, e-commerce apps, and share market apps for their daily needs. 61.7% of the population is using bank apps, 21.7% is using e-commerce apps, and 24.6% is using share market apps.

Specifically, 73.04% of respondents indicated that they prefer to use English.

When it comes to Nepali, 87.53% of respondents said they prefer to use Nepali in the Devanagari script, whereas, 78.07% of respondents said they prefer to use the Romanized script. Overall, it can be seen that while English is the most preferred language among the respondents, a significant number of respondents also prefer to use Nepali in both Devanagari and Romanized scripts. The preference for Devanagari script is slightly higher than Romanized script but the difference is not huge. The data suggests that the majority of respondents, 92.45%, believe that chatbots will either definitely or probably be helpful for this purpose. Specifically, 45.25% believe that chatbots will definitely and 47.20% of the respondents believe that chatbots probably will be helpful in getting information from government

offices. A smaller proportion of respondents, 5.48%, believe that chatbots probably won't be and finally, only 2.07% of respondents believe that chatbots definitely won't be helpful.

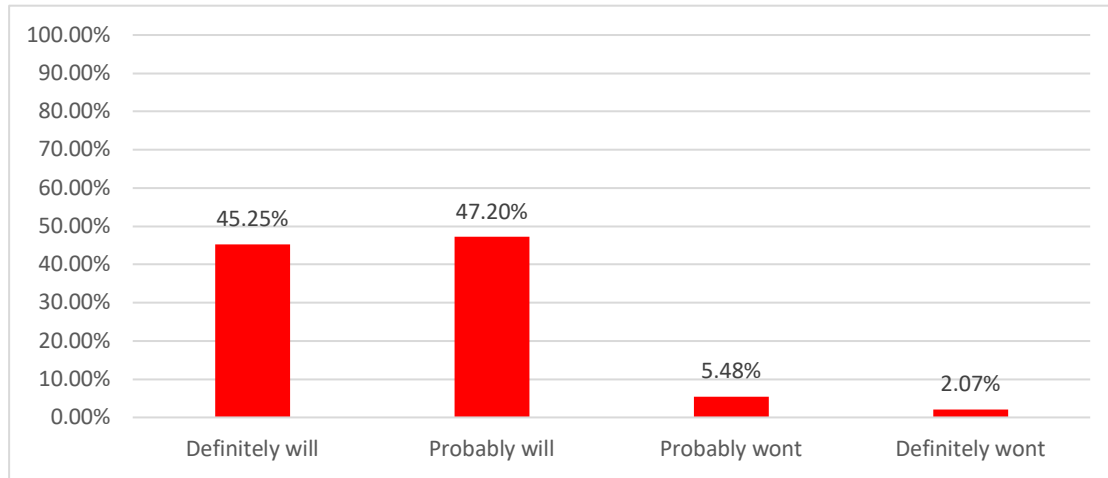


Figure 20 Prefer ability of Chatbot

Additionally, a large majority of respondents (82.89%) are willing to receive information about government offices through social media and chatting apps, with 41.45% saying they "definitely will" and 39.44% saying they "probably will". This indicates a strong interest in using digital channels to access government services.

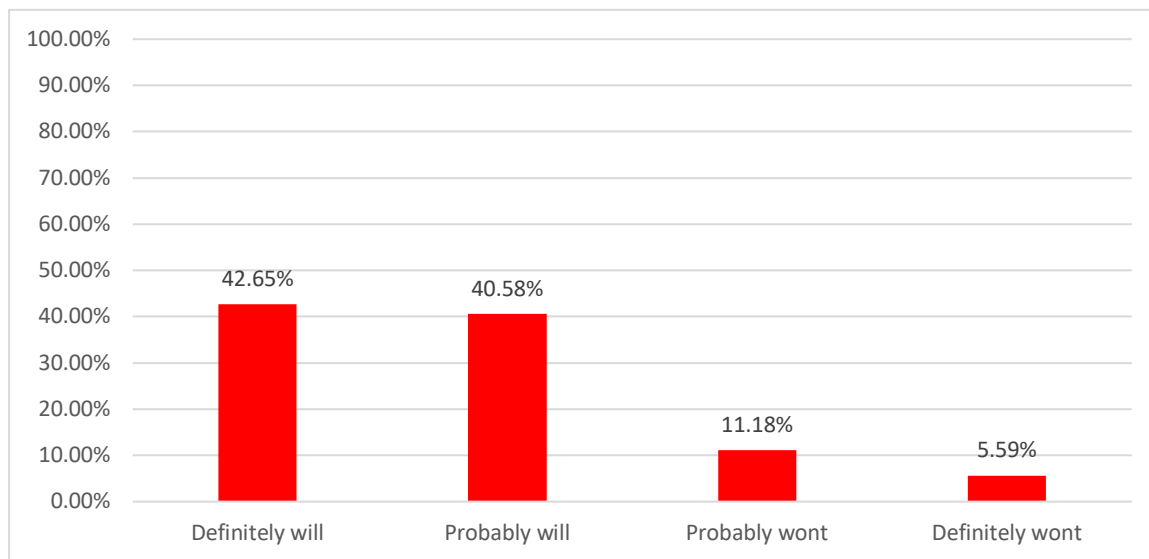


Figure 21 Interest to use government apps

3.2 Technical assessment of Local Government for chatbot

The results of our survey on the technical infrastructure of government offices reveal a positive outlook. The majority of offices have more than 10 computers in overall office space. Additionally, the performance of these computers was reported as good. This information highlights that government offices are technically equipped with Computer and CPU which is basic requirement for managing the interface of chatbot.

Performance of computer

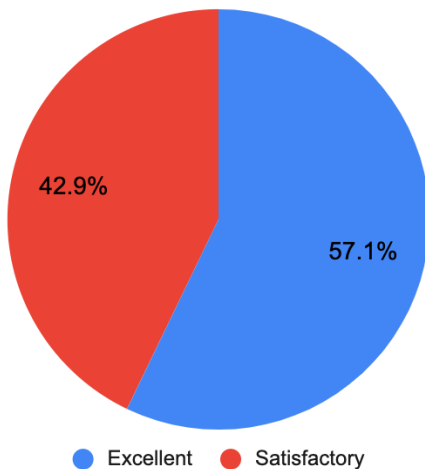


Figure 23 Performance of computer

Performance of internet

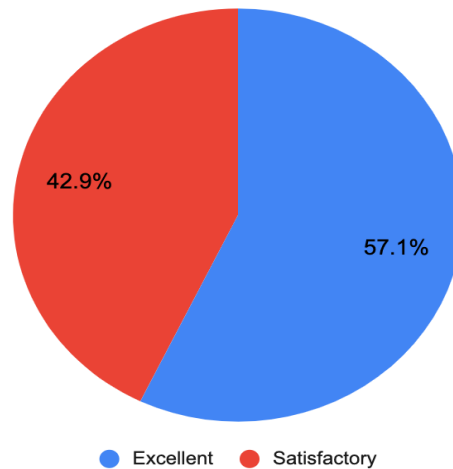


Figure 22 Performance of Internet

The survey conducted showed that all 15 government offices had access to the internet, with 100% of them reporting "Yes" to having internet access. The performance of the internet was evaluated and found to be either "Excellent" or "Satisfactory" based upon the perspective of the user. Eight out of the 15 offices reported the performance as "Excellent", which accounted for 57.14% of the total, while 6 offices reported the performance as "Satisfactory", accounting for 42.86%. This information highlights the positive outlook of the government offices towards technology and the infrastructure they possess.

The results of the survey indicate that the government office is technically sound and has a good foundation for the implementation of new technologies i.e 85.71% of surveyed agencies have more than 6 PC's around 71.43% of agencies has more than 6 laptop and 92.86% has 1 to 2 server computer. It is found that as based on physical infrastructure to ensure stable internet connectivity there are adequate number of router.

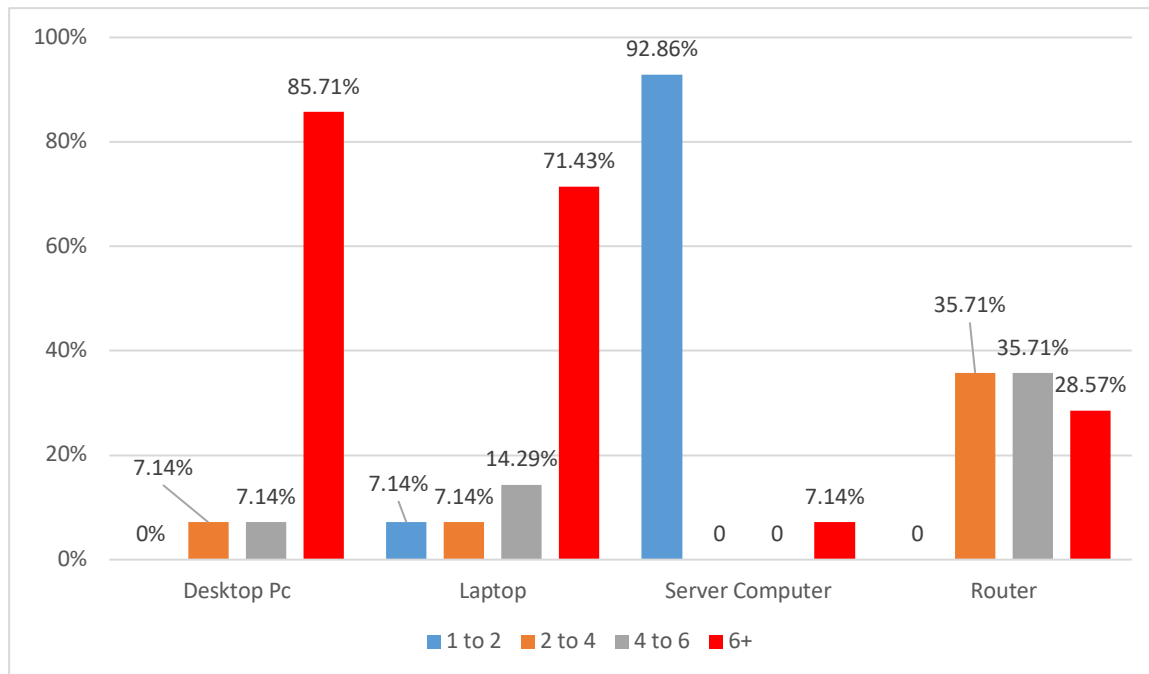


Figure 24 Technical Infrastructures of local government

In our survey about IT staff and room distribution, we uncovered some noteworthy findings. We found that the distribution of rooms across metropolitan areas, sub-metro areas, and municipalities was not proportionate. Additionally, the available space and number of people were unevenly distributed. In fact, the majority of services we evaluated had only one room available, and a significant percentage of individuals (69.23%) and services (56.24%) were concentrated in these limited spaces.

During our survey of software used in government offices, we observed that there are two broad categories of software in use. The first category comprises office-specific software, which is developed to meet the unique requirements of specific offices. Examples of such software include IFMIS (Integrated Financial Management Information System), SSMIS (Social Security Management Information System), RAIS (Revenue Administration Information System), NIDMS (National Identity Card Management Information System), LAMIS (Land Administration and Management Information System), HRMIS (Human Resource Management Information System), and EMS (Election Management System).

The second category of software includes general software that is commonly used in offices, such as Microsoft Office package, email clients, social media applications, web browsers, and image editing software like Photoshop. We found that general software is widely installed across government offices, with approximately 50% of offices using desktop-installed software and 50% using web-based software. The percentage distribution of general software usage was 50% for 1 to 3 users, 35.71% for 3 to 6 users,

0% for 6 to 9 users, and 14.29% for 9 or more users. Regarding office-specific software, we observed that both web-based and desktop-installed software is in use, with the percentage distribution being 7.14% for 1 to 3 users, 28.58% for 3 to 6 users, 64.29% for 6 to 9 users, and 0% for 9 or more users for desktop-installed software. For web-based office-specific software, the percentage distribution was 7.14% for 1 to 3 users, 50% for 3 to 6 users, 42.86% for 6 to 9 users, and 0% for 9 or more users.

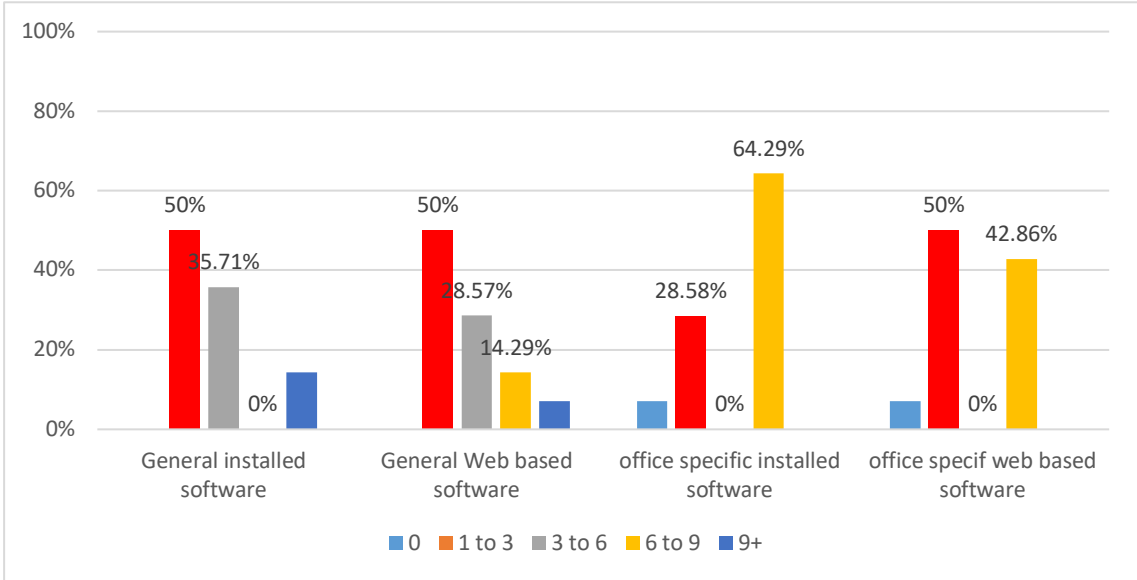


Figure 25 Software availability and usages in government

In our survey of the major channels of information distribution, we found that all of the local government offices have a website developed by the Nepal government under the PLGSP program and hosted by the Department of Information Technology (DoIT). The performance of these websites, as reported by the IT personnel, is deemed to be good and stable, with no downtime reported. These websites serve as a source of information for the public, with details of services, the composition of teams, bidding notices, vacancy notices, and office hours available for view. A variety of media, including text, graphics, video, and audio, are posted on these websites to effectively disseminate information to the public.

The frontend of the government office website is user-friendly and well-designed. The backend of the website is equipped with tools to allow the IT officers to edit the content, making the website dynamic and constantly updated. There is a dedicated person in the government office who is responsible for maintaining and updating the website. However, the website lacks a feature to track the visitors, which could be useful in understanding the usage and popularity of the website.

The survey showed that out of the 15 IT personnel surveyed, 9 (64.29%) reported having the feature of issue reporting on the website, while 5 (35.71%) reported not having it. In terms of live help on the website, 10 (71.43%) reported not having this feature, while only

3 (21.43%) reported having it. This indicates that the website has room for improvement in terms of its interactivity with visitors.

Feature of issue reporting in website

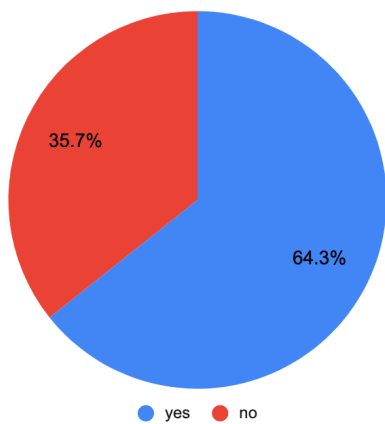


Figure 27 Feature of issue reporting

Feature of live message in website

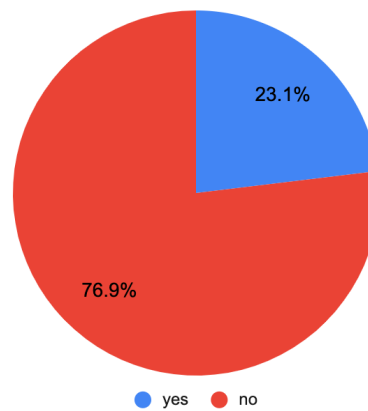


Figure 26 Live messaging feature

According to a data, it has been discovered that all local government bodies have a Facebook page. Moreover, the survey also found that 64.29% of these local government bodies have a presence on YouTube, while 35.71% are active on Twitter. There was no usage recorded for Instagram or LinkedIn among the surveyed local government bodies.

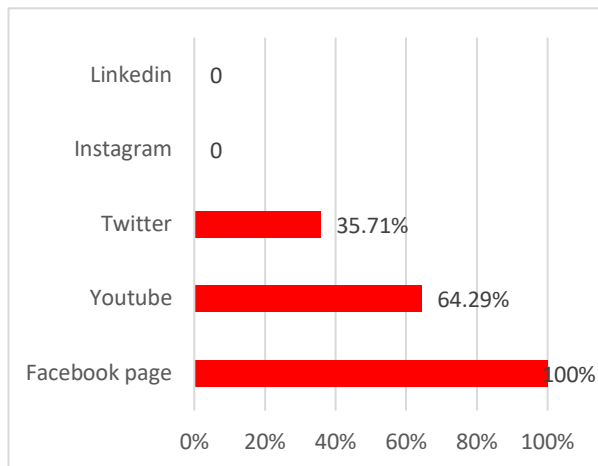
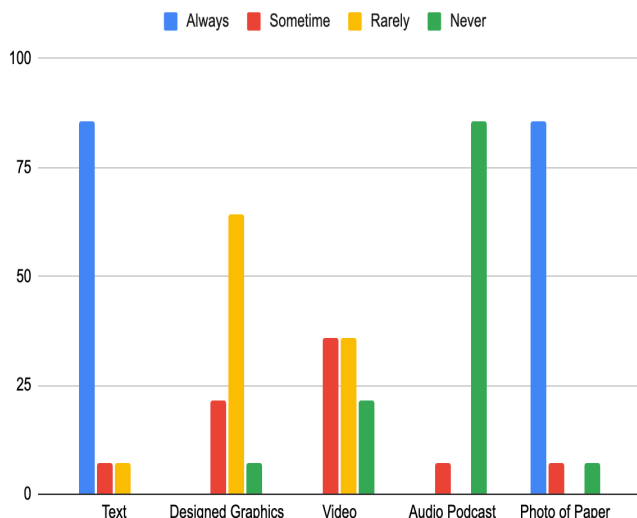


Figure 28 Information Distribution Channel

Additionally, 85.71% of the organizations share bidding notices, 78.57% share information about opening and closing times, and 64.29% share their physical address on this platform. A smaller percentage of organizations use social media to share the composition of their team (57.14%) and other information (21.43%). With the widespread use of social media by these organizations, there is potential for integrating a chatbot to better interact with and serve the public.

The results of the survey show that text is the most popular media type for information distribution. With 85.71% of respondents saying that they always use text, it is evident that this type of media is widely adopted. On the other hand, designed graphics are used less frequently, with only 21.43% of respondents saying that they use it sometimes, and

7.14% saying that they rarely use it. The same can be said for video, with 35.71% of respondents saying they use it sometimes and 21.43% saying that they rarely use it. Audio podcasts are even less popular, with only 7.14% of respondents saying that they use it rarely. Lastly, photo of paper is used frequently, with 85.71% of respondents saying they always use it and 7.14% saying they rarely use it. In conclusion, text and photo of paper are the most widely used media types for information distribution, while audio podcasts and designed graphics are used less often.



Furthermore, they rely on Facebook automation which is not effective in managing messages and can result in the public not receiving proper responses. This highlights the need for a more comprehensive approach to social media management in government offices, with improved message handling and response rates.

Figure 29 Information types

According to the survey majority of the respondents, 42.86% believe that the implementation of a chatbot system in a government organization will probably have benefits for the public. 35.71% of the respondents believe that

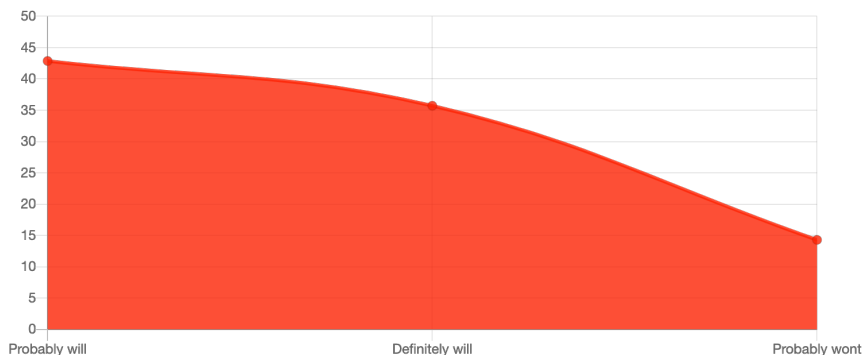


Figure 30 Perspective on usefulness of chatbot by Local Government

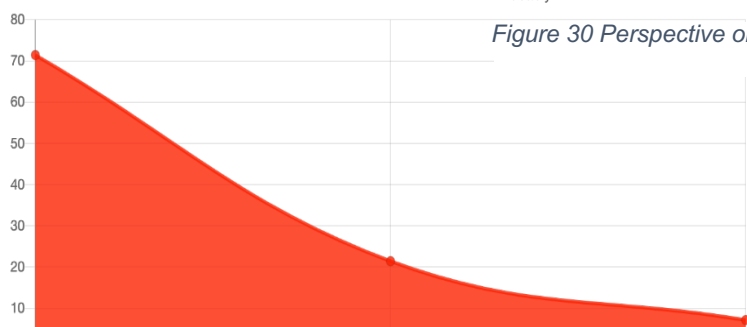


Figure 31 Willingness to develop chatbot

it will definitely have benefits. On the other hand, 14.29% of the respondents believe that it probably won't have benefits. No one responded that it definitely won't have benefits.

When it comes to the development with help of others, the majority of the respondents, 71.43%, believe that they would probably like to develop. 21.43% of the respondents definitely want it. Only 7.14% of the respondents believe they probably wouldn't like to develop if they get support also.

3.3 Government personnel:

We aimed to investigate the perceptions of government personnel towards the sharing of information and the use of chatbot technology. This research was particularly relevant as local governments often provide similar services and have comparable department structures, manpower numbers, and budget information available on their websites. The questionnaire was designed to collect data from personnel in various roles, including local government officials elected by the public, administrative officers, spokespersons, information officers, receptionists, front desk staff, and public support staff. The questionnaire was structured into five subheadings that addressed the overall service and function of the office, government service and the general public, information providing to the public, visits to government offices, phone calls to government offices, and chatbot technology. Initially, we planned to conduct the survey at all 14 selected sites using the full questionnaire. However, based on the feedback received, we found that conducting the full questionnaire at all 14 sites was not necessary and a more focused approach was needed. Most of the local governments often provide similar services and have comparable department structures, manpower numbers, and budget information in which most of them are mentioned on their website also.

As a result, we selected a representative sample of 5 sites, which included 2 metropolitan cities (Pokhara Metropolitan city and Lalitpur Metropolitan city), 1 sub metropolitan city (Butwal), 1 rural municipality (Mangalsen), and 1 urban municipality (Ratnanagar). We conducted both interviews and questionnaires to gather the necessary data. In addition to conducting interviews and questionnaires, we also reviewed previous research on similar topics to provide context for our findings. By using a representative sample and combining multiple research methods, we were able to gain a comprehensive understanding of the perceptions of government personnel towards the sharing of information and the use of chatbot technology.

Our findings are explained below.

About overall services and function of office

All the local government entities have similar types of services delivery and function in alignment with the local governance operation act 2074. The act has clearly defined the

services that a local government can provide and are guided by the act.

Government service and general public

In case of survey on service delivery, it is found that not all services are concentrated at the metropolitan city, sub-metropolitan city, and municipality level. Many services are also provided at the ward level by the ward offices. For example, the ward offices may be responsible for providing essential services such as birth and death registration, issuance of citizenship certificates, and management of local schools. On the other hand, higher-level tasks such as urban planning, waste management, and road infrastructure are typically managed by the metropolitan city, sub-metropolitan city, and municipality level. However, from the perspective of government personnel, while service delivery may be acceptable, there are often problems due to a lack of awareness among the public about necessary documents and procedures. For example, citizens may not have the necessary identification documents required to receive government services or may not be aware of the steps needed to obtain them. This lack of awareness can lead to delays and difficulties in service delivery, which can have significant consequences for citizens who rely on these services.

Information providing

While survey about information dissemination from local government it is found that most government organizations in Nepal have appointed an information officer who is responsible for providing all necessary information to the public. To further ensure transparency and accessibility, notice boards have been placed in local government offices to share important notices, and these notices are also published in local newspapers. Additionally, relevant information is shared digitally on official websites and through social media platforms.

Visit of public on government office

During a survey, it was discovered that there is a significant disparity in the number of visitors to municipal versus metropolitan and sub-metropolitan offices. Interviews conducted during the survey revealed that the number of visitors tends to be seasonal, with more visitors during the winter season and fewer during the monsoon season. The survey also examined the call-handling practices of government offices and found that they receive an average of 50-100 phone calls daily. All most all offices do not have a dedicated call centre system in place, although Lalitpur is currently planning to install one. The most common queries received by the offices related to service closing times and required documents. When asked about call recording practices, the offices reported that they do not record phone calls.

Government perspective on chatbot system

Name of Local Government	Chatbot Usability	Want to Implement If Funded By Other	Want to Build Our Own	Can Allocate Person	Can Allocate Budget
Lalitpur Metropolitan City	High	Yes	Yes	Yes	Yes
Pokhara Sub-Metropolitan City	High	Yes	Yes	Yes	Yes
Butwal Sub-Metropolitan City	High	Yes	Yes	Yes	Yes
Ratnanagar Municipality	Medium	Yes	No	Yes	Could not say
Mangalsen Municipality	Low	No	No	Yes	Yes

The table represents the willingness of different local governments in Nepal to implement chatbot technology for service delivery. Based on the information provided in the table, it can be observed that metropolitan cities such as Lalitpur and Pokhara have a high level of interest in implementing chatbot technology, and are willing to allocate personnel and budget to build and operate it in-house. Similarly, Butwal, a sub-metropolitan city, also has a high level of interest and willingness to build and operate the chatbot technology in-house. On the other hand, Ratnanagar Municipality and Mangalsen Municipality, among them Ratnanagar is categorized as urban and Mangalsen categorized as rural municipalities, Ratnanagar Municipality is willing to implement chatbot technology with funding, but is not willing to build and operate it in-house. Mangalsen Municipality, on the other hand, is not interested in implementing chatbot technology at all. This difference in willingness to implement chatbot technology can be attributed to a variety of factors such as the availability of resources, level of urbanization, and political will. Metropolitan and sub-metropolitan cities tend to have higher levels of urbanization, larger budgets, and greater availability of resources compared to rural municipalities, which may explain their greater willingness to implement chatbot technology.

The latest and foremost detailed study on assessment of data management covering 200 local government was done by Nagesh Badu in 2022 AD. According to his study, the local governance (LGs) in the country has poor data governance and management capacity. The majority of LGs have not allocated a budget for data management and do not conduct any training. The responsibility for data management is mostly given to IT units and very few LGs have a dedicated unit. Data collection is mostly on an ad-hoc basis and mostly for LG profile and employment.

3.3 Departments of Information and technology

During the visit to the Department of Information Technology, the chatbot project team

had the opportunity to showcase their innovative product and explain its various use cases. The representative from the department displayed a keen interest in the integration and deployment of the chatbot, showing an eagerness to learn more about the technical aspects involved.

The team provide a comprehensive explanation, detailing how the chatbot would be integrated on popular social media platforms such as Facebook and various instant messaging apps. After discussing specific technical details, the representative assured the team that the chatbot could be deployed on the DOIT server. Additionally, the representative suggested that the team make the chatbot inclusive for individuals with disabilities and stressed the importance of making the core system centralized to ensure efficient functioning.

3.4 National Information Commission

During the survey at the National Information Commission, it was discovered that they are developing a new system in collaboration with Nepal Telecom to enable individuals to report and request information from organizations that may not be forthcoming. This represents a significant technological advancement in the Commission's efforts to promote transparency and accountability in information dissemination.

The Chief Information Commissioner Mahendra Man Gurung expressed a positive outlook towards chatbot technology and showed interest in incorporating it into their system. It was clear that the Commission is dedicated to adopting the latest technological advancements to achieve its mission of promoting transparency and accountability in information access. The team was excited to hear about the Commission's enthusiasm towards chatbot technology and looks forward to the possibility of collaborating with them to enhance their efforts further.

3.6 Ministry of labor employment and social security

During a visit to the Ministry of Labour, Employment, and Social Security, we met with a team of engineers who are dedicated to streamlining the ministry's processes and providing digital information and services. The team expressed great interest and enthusiasm in implementing a chatbot, displaying their eagerness to learn about the technology involved. The importance of the Nepali language in building the chatbot was emphasized, and the team was eager to understand our team and use cases. The Ministry has developed various systems to provide information about their services, policies, and regulations. The team has been wanting to build a chatbot system for approximately 4.5 years, but they have faced obstacles. They felt that a chatbot system would be particularly beneficial to individuals abroad who lack access to information. Currently, the Ministry uses a call center, SMS system, and various forms for digitizing services. It was evident that the Ministry is committed to using technology to improve their services and meet the needs of Nepali citizens. Future collaborations with the Ministry in this area are

promising.

4 Conclusion

In conclusion, the survey results indicate that the majority of respondents in Nepal utilize government services related to obtaining certificates, with the Citizenship Certificate being the most frequently used service. The need for obtaining a National ID Card and Driver's License was also prominent among respondents. Additionally, the data shows that most respondents prioritize gathering information before visiting government offices, with nearly 76% conducting research beforehand. However, almost half of those who sought information through both online and offline means reported that the information they obtained was incomplete. The government's website and Facebook page were the most commonly used channels to receive information about government services. Finally, while English is the most preferred language among respondents, a significant number also prefer to use Nepali in both Devnagari and Romanized scripts.

In Nepal, the national government is responsible for formulating policies and strategies

related to the IT sector. The Ministry of Communication and Information Technology (MoCIT) is the main government agency responsible for promoting and regulating the development of the IT sector in Nepal. Local governments in Nepal, such as municipalities and rural municipalities, may also allocate their own budgets for IT-related activities and projects. However, the specific policies and allocation of budget may vary depending on the local government and their priorities. Majority of the government office is equipped with modern and up-to-date IT infrastructure. As per the survey results, a significant number of server computers (92.86%) have 1 to 2 systems data storage and management, which showcases the availability of adequate technical resources. Furthermore, the majority of laptops (71.43%) in the office are 6 or more, indicating that the employees have access to powerful and fast devices. The desktop PCs in the office also follow a similar trend, with 85.71% of them being 6 or more in number. This shows government are technically capable for chatbot installation.

Also, based upon the willingness to pay if chatbot will be installed in government system, positive response was given by 70% of the bodies mirroring the financial commitment to install chatbots. The data presented also highlights the changing trend of technology adoption among the population in Nepal. The results indicate that a significant portion of the population is increasingly utilizing technology for various daily activities, such as taking classes, watching videos, mobile top-up, digital payments, money transactions, online shopping and online ticket booking.

The data presented in this report suggests that the population in Nepal is increasingly adopting technology in various fields, from entertainment to daily activities such as bill payment, and even in secure things like money transactions. It also indicates that there is potential for further growth in technology adoption in various fields, in order to enhance the accessibility and efficiency of services provided by the government and private organizations. This information highlights the current state of online communication with government services in Nepal and the need for more effective and user-friendly online platforms for citizens to access information and communicate with the government.

5 Recommendation

In an effort to improve service delivery, communication and access to information, the government of Nepal has adopted various online mediums for improving two-way communication and information management. However, the desired level of effectiveness is still to achieve and to improve the government service delivery, following recommendations can be made from this study.

Chatbot Installation: The government should install chatbots on their websites and social media platforms to provide quick and accessible information to citizens. With the majority of the population having access to mobile phones, a chatbot will provide a convenient and user-friendly alternative for obtaining information and communicating

with the government. The survey revealed that the majority of respondents reported that the information they found was not complete when searching for information online. A chatbot can provide citizens with a more complete source of information and help make information more accessible to the public. Also, survey revealed that 25% of respondents reported having a negative experience when communicating with government services through phone calls. A chatbot can improve this communication by providing citizens with a more efficient and effective way to receive information and communicate with the government. So far from our experience and observation specific to various local government, we believe chatbot must be piloted in metropolitan cities and municipalities in accessible areas like Kathmandu Metropolitan city, Lalitpur Metropolitan city, Pokhara Metropolitan city, Butwal Sub metro-politan city, Bharatpur Municipality etc where most of the population have internet access and smartphone as medium for online communication. The government is also resourceful both technically and economically to install chatbots which can also show feasibility while piloting chatbots.

Website and Social Media Upgradation: The government should upgrade their websites and social media platforms to make them more user-friendly and accessible to citizens. The websites should be regularly updated with complete information related to various services including chatbots, and the social media platforms should be used to communicate with citizens effectively. The majority of people do not effectively search for information related to the services they need before visiting the office. The government can make the information more accessible by creating a comprehensive and user-friendly website that contains all the information and services needed by the citizens. Although the use of social media for obtaining information and communicating with the government was found to be low, it is recommended to increase the presence of government services on social media platforms such as Facebook, Tiktok and Instagram to reach a larger audience. A feedback mechanism should be established to allow citizens to provide their opinions and suggestions on the services provided by the government. This feedback can be used to make improvements in service delivery.

Training for Citizens, Government employees and promoting online services: The government should encourage the adoption of technology by citizens for various services. Government should initiate training programs for citizens on how to access information and services online. The training should be aimed at increasing the number of citizens who are familiar with e-commerce and the various online platforms available for obtaining information. Employees at government offices should be trained to provide complete and accurate information to citizens and handle inquiries efficiently. Also, separate package for non-trained citizen on digital literacy also seems essential. The government should actively promote their online services and encourage citizens to use them. The promotion should focus on the convenience and accessibility of these services and the benefits they provide to citizens. The government should also consider using instant messaging apps such as Messenger, WhatsApp, Viber, and Telegram to communicate with citizens and provide information about government services.

Improving Online learning and payment systems: The government should encourage the growth of online learning platforms in Nepal. This can be achieved by providing support to existing platforms and promoting the benefits of online learning to citizens. The government should focus on improving their online bill payment services to make them more accessible and user-friendly. This will reduce the time and effort required to pay bills and improve the overall experience of citizens.

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- <https://www.youtube.com/@nepalmedia5898/videos>
- <https://www.youtube.com/@budhanilkanthamunicipality2421>
- <https://www.youtube.com/@tokhamunicipality319/featured>

Annex: List of Local Governments surveyed

- Metropolitan City level : Kathmandu, Lalitpur, Pokhara
- Sub metropolitan city – Nepalgunj, Butwal
- Municipality- Chandragiri, Tokha, Kirtipur, Budhanilakantha, Ratnanagar, Tilotama, Sanfebagar, Mangalsen, Kirtipur
- Rural Municipality - Bannigadhi Jayagadh RM