E-GMP

E-Governance Master-plan for Madhesh Province

Final Report, Version 1.0, 3rd July, 2023

SUBMITTED TO

Office of the Chief Minister and Council of Ministers (OCMCM)

Provincial and Local Governance Support Programme (PLGSP)

Provincial Programme Implementation Unit (PPIU)

Madhesh Province, Janakpur

SUBMITTED BY

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MEETING HISTORY

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2023-02-06	OCMCM	Agreement Signing	Agreement signing with OCMCM/PLGSP
2023-02-07	OCMCM	Kick-Off	Initial plan and inception
2023-02-19	Online Meeting	Queries	Questionnaires and Interview Questions
2023-02-27	OCMCM	Inception	PPT On Project Plan
2023-03-19	OCMCM	Inception Finalization	Methodology finalization, research guidelines and suggestions collected
2023-03-19	PLGSP	Data Collection Planning	Letter issue, data collection planning
2023-04-23	Indreni, Ktm	1st Focused Group Discussion	with E-Gov Experts
2023-04-25	Rama Hotel, Janakpur	2nd Focused Group Discussion	With Provincial Ministry Officials
2023-04-26	Rama Hotel, Janakpur	3rd & 4th Focused Group Discussion	With CAO's & IT Officers
2023-05-09	PLGSP-Ktm	PPT and Feedback	Collected feedback
2023-05-16	PLGSP-Ktm	Reports Finalization	Presented and collected feedback from ICT/ E-Government Specialist
2023-05-18	PLGSP	Presentation	To OCMCM/ PLGSP
2023-05-23	PLGSP, KTM	Presentation	Presented and collected feedback from ICT/ E-Government Specialist
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2023-07-02	Hotel Welcome	SCW-2	Final PPT and finalization

ACKNOWLEDGEMENT

We would like to express our sincere gratitude and appreciation to the following individuals who have made significant contributions to the development of the E-Government Master-plan. Their dedication, expertise, and relentless efforts have been instrumental in shaping this comprehensive framework for the digital transformation of our governance systems for Madhesh province.

First and foremost, we extend our heartfelt appreciation to Mr. Kishor Kumar Chaudhary, Acting Principal Secretary of the Office of the Chief Minister and Council of Ministers (OCMCM) in the Madhesh Province. Your visionary leadership, strategic guidance, and unwavering commitment to modernizing government services have been the driving force behind the realization of this Master-plan.

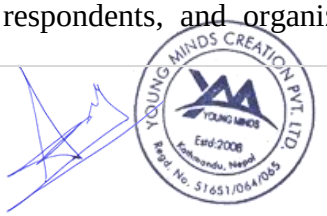
We would also like to extend our gratitude to Mr. Krishna Bahadur Raut, Past Principal Secretary of OCMCM, Madhesh Province, for his valuable insights and contributions during the initial phases of the Master-plan. Your expertise and experience have played a crucial role in laying the foundation for this transformative initiative.

We would like to recognize the immense efforts of Mr. Hemanta Niraula and Mr. Nurahari Khatiwada, Secretaries of OCMCM, Madhesh Province. Your dedication and tireless work in coordinating various aspects of the Master-plan, including feedback, stakeholder engagement, and implementation strategies, have been invaluable.

A special thanks goes to Mr. Bipin K Thakur and Mr. Rupesh Sah, Under Secretary at OCMCM, for his diligent efforts in assisting with the development and execution of the Master-plan. Your meticulous attention to detail and organizational skills have greatly contributed to the success of this endeavor.

We would also like to acknowledge Mr. Nagesh Badu, ICT Specialist at the Provincial and Local Governance Support Program (PLGSP), for his technical expertise and guidance throughout the process. Your deep understanding of information and communication technologies and their potential in improving governance has been crucial in shaping the technological aspects of the Master-plan. We would also like to acknowledge the entire PLGSP Madhesh Province team. Your dedication, collaboration, and collective efforts have been vital in realizing the vision of the E-Government Master-plan.

We would like to extend our gratitude to all the individuals, officials, experts, participants, respondents, and organizations involved in this endeavor. Your collaboration, support, and



commitment have been instrumental in realizing the vision of the E-Government Master-plan. We are grateful for your contributions and look forward to working together to bring about positive change in our governance systems.

Lastly, we extend our gratitude to the entire **Young Minds Creation Pvt. Ltd** research team members for their sincere hard work and dedication in this E-GMP formulation. Your innovative research, ideas, enthusiasm, and fresh perspectives have added immense value to the development of the master-plan.

Thank you all once again for your invaluable contributions.

Sincerely,

Dr. Abhijit Gupta – Team Leader
Young Minds Creation Pvt. Ltd.

EXECUTIVE SUMMARY

The Madhesh Provincial Government has recognized the necessity for an e-government Master-plan that assess the current state of the Madhesh Province in field of ICT domain and prioritize e-governance systems at Province-level. The main objective is to develop a comprehensive 10 years e-Governance Master Plan for Madhesh Province. This plan aims to serve as a significant milestone in localizing ongoing electronic governance initiatives at the provincial level, with the goal of enhancing civil service delivery and streamlining the assessment process. The master plan aims to leverage technology and digital solutions to enhance governance, service delivery, and citizen engagement within the province.

Meetings were conducted to establish a shared understanding of the project's objective, formulating a steering committee and technical committee, and developing a common vision to move the project forward. Consensus was reached through these meetings, resulting in an endorsement of the initial requirement discussion, workflow discussion, and commitment to the project. An inception report was prepared and presented to the OCMCM/PLGSP, receiving approval on 2079-12-06.

The questionnaire was prepared and upon approval by OCMCM/PLGSP Madhesh, survey was conducted with Ministries, Public Agencies. Key-Informant Interview with nearly 15 persons having rich understanding on ICT and e-Governance process and systems in Nepal was undertaken. Focus group discussions (FGD) with high-level familiarity towards e-government programs and projects was also conducted. FGD was conducted in different groups – first was conducted with participants with rich understanding in ICT/E-Government, second was conducted with Madhesh Provincial Government officials and third and fourth were conducted with participants such as CAO's and IT Officers from different Local Government. Furthermore, preliminary ICT stock taking was carried out from 38 provincial and local governmental agencies of Madhesh province.

The research was divided into five key areas, namely Environment, Human Resources, Infrastructure, Investment, and Software, to facilitate comprehensive and manageable studies. The findings and analysis from the research were organized accordingly, and recommendations were formulated based on the results.

One of the key recommendations is the establishment of a dedicated agency called the ICT Council, led by the Honorable Chief Minister, to oversee the implementation of the recommended 10-year e-Governance Master Plan (e-GMP). This recommended council would also be responsible for monitoring the annual progress towards achieving the set goals. The

council should further prioritize the development, monitoring and implementation of proposed activities in the e-GMP.

The implementation of the developed systems can be achieved through two approaches: replicating existing federal systems or utilizing the SASS model. Additionally, several other recommended systems include centralized website system, CM Dashboard, Integrated Municipality system, agriculture and livestock system, EHR, Tourism MIS, Integrated Transport system, Integrated Industry System, Integrated Forest System, e-Learning Management system, Talent Acquisition System, and Integrated Youth and Sports system. These systems must adhere to open standards, GEA, and Website/Mobile App development guidelines. They should also incorporate provisions for data exchange through built-in APIs and ensure interoperability. Ongoing capacity development training for officials and continuous digital literacy initiatives for citizens are essential. Evaluations of the proposed activities will be conducted twice a year to assess progress and achievements, enabling effective planning for the subsequent year.

The implementation of the e-GMP is expected to enhance e-services and promote good governance, leading to increased accessibility of government services for the citizens of Madhesh Province. Consequently, e-GMP would contribute to the improvement of the e-governance of the province.

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Table 2 – List of Abbreviations

AI	Artificial Intelligence
API	Application Programming Interface
CE	Capital Expenditure
CIT	Citizen Investment Trust
CSV	Comma Separated Value
e-GMP	e-Governance Master-plan
EP	Employment Provider
EPF	Employee Provident Fund
ESSP	Employment Support Service Provider
GEA	Government Enterprise Architecture
GoN	Government of Nepal
G2C	Government to Citizens
G2B	Government to Business
G2G	Government to Government
ICT	Information and Communication Technology
IOT	Internet of Things
IT	Information Technology
JS	Jobseeker
MoEIWS	Ministry of Energy, Irrigation and Water Supply
MoF	Ministry of Finance
MoFE	Ministry of Forests and Environment
MoHP	Ministry of Health and Popluation
MoHACL	Ministry of Home Affairs, Communications and Law
MoICT	Ministry of Industry, Commerce and Tourism
MoLMAC	Ministry of Land Management, Agriculture and Cooperative
MoLT	Ministry of Labor and Transport

MoPID	Ministry of Physical Infrastructure and Development
NeGIF	Nepal e-Governance Interoperability Framework
NPC	National Planning Commission
NRI	Network Readiness Index
OCMCM	Office of the Chief Minister and Council of Ministers
OPMCM	Office of Prime Minister and Council of Ministers
OS	Operating System
OWASP	Open Web Application Security Project
P-ASIP	Provincial Annual Strategic Implementation Plan
PDF	Portable Document Format
PG	Provincial Government
PIS	Personnel Information System
PLG	Provincial and Local Government
PLGSP	Provincial and Local Governance Support Programme
PPPC	Province Policy and Planning Commission
PPIU	Provincial Programme Implementation Unit
PRTC	Province Research and Training Center
SASS	Software as a Service
SDD	Software Design Document
SLA	Service Level Agreement
SMS	Short Message Service
TAM	Technology Acceptance Model
TOR	Terms of Reference
TOT	Training of Trainers
TSP	Training Service Provider
UAT	User Acceptance Test
UN	United Nations
VAPT	Vulnerability Assessment and Penetration Testing
VAT	Value Added Tax

VMGOS	Vision, Mission, Goals, Objective and Strategy
WCE	Working Capital Expenses

CHAPTER 1 - INTRODUCTION

This chapter deals with the general information of the topic as a whole and pinpoints the background, objectives, scope and theme of research.

1.1 BACKGROUND

Madhesh Province is a province located in southeastern Nepal and was formed after the adoption of the Constitution of Nepal 2072. It shares borders with Koshi Province to the east, Bagmati Province to the north, and India's Bihar state to the south.

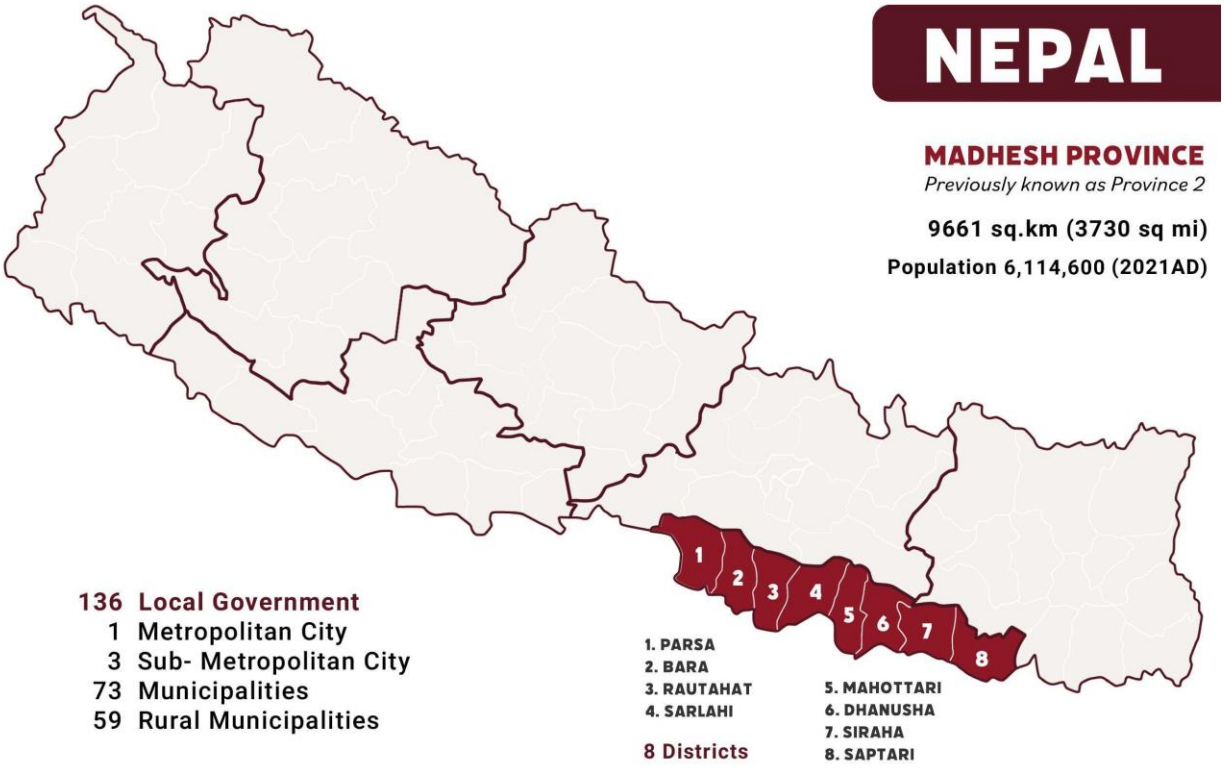

Figure 1 – Madhesh Province Map and Data (Central Bureau of Statistics, 2021)

The province covers an area of 9,661 km2 (3,730 sq mi), which is about 6.5% of the country's total area, and has a population of 6,114,600 as per the 2021 Nepal census. It is the smallest province in terms of area and the most densely populated province in Nepal. The Koshi River acts as the provincial demarcation border between the Province and Koshi Province in the east,

while the demarcation line between Chitwan National Park and Parsa National Park acts as the provincial demarcation border between Madhesh Province and Bagmati Province in the west. The province consists of eight districts, and the majority of the population speaks Maithili, Bhojpuri, Bajjika, Magahi, and Nepali. (Central Bureau of Statistics, 2021)

The province has 136 local governments, all of which publish digital information through websites. As seen on FY 075/076, 40% of the public agencies are using ICT and 75% of the citizens are found to be using internet or mobile or telephone. Also, 5% of public services are found to be using technology. Mobile communication users has been significantly increasing in Madhesh province. Moreover, the adoption of ICT for the exchange of information among government agencies has enabled the delivery of diverse services via digital platforms. (Provincial Policy and Planning Commission, 2077).

The **Sustainable Development Goals** (SDGs) are a global framework for sustainable development, and they can also be applied to specific regions or sub-national areas like Madhesh Province. The specific SDGs relevant to Madhesh may vary based on the province's unique challenges, resources, and socio-economic conditions. Some common areas of focus for the SDGs in Madhesh may include poverty reduction, quality education, healthcare, clean water and sanitation, sustainable agriculture, infrastructure development, employment generation, gender equality, and climate action.

By aligning development efforts with the SDGs, Madhesh Province aims to work towards sustainable and inclusive development, improving the well-being of its residents, and ensuring a more prosperous future for the province.

1.2 PROJECT BACKGROUND

This document describes the **formulation of e-Governance Master Plan for Madhesh Province** including what the objectives are, how it will be carried out, and who the stakeholders are, activities with action plan/ outcome and recommendations. This document will act as a crucial ingredient in planning the e-Governance activities.

Formulation of e-Governance Master Plan for Madhesh Province is an elaborative plan which will enable Madhesh Province Government to recognize the areas of e-governance intervention, gaps, skills, resources and implementation modalities, leading to complex framework on use of ICT in public governance. (OCMCM Madhesh, 2023)

The expected goal of this assignment is to formulate e-GMP for Madhesh Province. The end result of this project will deliver as per the requirement stated in the TOR and briefed by the OCMCM officials during the various phases of project. (OCMCM Madhesh, 2023)

Table 3 – Project Summary (OCMCM Madhesh, 2023)

Project Title	**Formulation of e-Governance Master-Plan for Madhesh Province**
Project/ Contract No	OCMCM/PLGSP/PPIU-CONS-079/80-04
Project Duration	4 Months
Agreement Signed on	February 06, 2023
Project Start Date	February 06, 2023
Project End Date	July 05, 2023
Main Direct Beneficiary	OCMCM- Madhesh Pradhesh
Funding Agency	Provincial and Local Governance Support Programme
Consultant Name	Young Minds Creation Pvt. Ltd
Focal Person from Consultant	Dr. Abhijit Gupta (Team Leader)
Production Methodology	Phase wise ▪ Preparation of Inception Report ▪ Preparation of Questionnaire, Checklist for Surveys ▪ Preparation of Preliminary draft e-GM Plan ▪ Presentation of Draft e-GM Plan ▪ Final e-GMP Submission
Number of Key Experts	Proposed 8 Key Experts
Overall Objective	To formulate e-Governance master plan for the Madhesh Province
Scope of Work	▪ Conducting detail assessment of Madhesh Province's e-governance capabilities of ICT technology maturity and skill availability, Change management readiness, public e-readiness and capacity ▪ Analysis of ICT and e-governance services of infrastructure and application landscape, relevant plans and policies related to ICT

	▪ Design of conceptual enterprise architecture for e-governance including clear goals, strategies directions, guiding principles, and approach of e-GMP ▪ Development of comprehensive implementation roadmap comprising ten-year e-GMP, including concrete action plans and costing, implementation modalities ▪ Setting benchmark and creating milestone for result-based monitoring activities on e-GMP's implementation, outcome and impact.
Expected Output/Deliverables	▪ Inception Report ▪ Questionnaires, Checklists for surveys, KII, FGD, Stock taking ▪ Preliminary draft e-GM Plan ▪ Presentation of draft e-GM plan ▪ Final e-GMP

1.3 OBJECTIVES

The main objective of the assignment is **to formulate e-Governance Master Plan (e-GMP) of Madhesh Province**. The specific objectives of the assignment are:

1. To assess the current situation within the Madhesh Province, in terms of the area of ICT domain (legal status, existing plans and programs, public service delivery, infrastructure development need, human resource management, data and information management).
2. To identify and prioritize the areas of e-governance systems in province level.
3. To provide recommendation regarding the institutional setup, legal and policy arrangements for operationalizing e-Governance system.
4. To provide the basis of efficient, effective, transparent and user-friendly governance in Madhesh Province.
5. To suggest the possible areas of interventions and mainstreaming strategies to implement the e-Governance system in Madhesh Province. (OCMCM Madhesh, 2023)

1.4 PROJECT TEAM

The team-members responsible for the preparation of E-Government Master Plan for Madhesh province are mentioned in below table

Table 4 – Project Coordination Team (OCMCM/ PLGSP)

SN	NAME	Position
1	Mr. Nurahari Khatiwada	Province Secretary
2	Mr. Bipin Thakur	Under Secretary
3	Ms. Seema Yadav	Computer Officer
4	Mr. Krishna Kumar Shah	ICT/ E-Government Expert
5	Mr. Krishna Bahadur Raut	Secretary (Advisor)
6	Mr. Nagesh Badu	ICT / E-Government Specialist (Advisor)

Table 5 – Project Development Team (Young Minds Creation)

SN	NAME	Position
7	Dr. Abhijit Gupta	Project Manager/ Team Leader
8	Mr. Guru Prasad Subedi	Governance Expert
9	Dr. Shreedhar Marasini	ICT Expert (e-Governance)
10	Mr. Khimananda Oli	Information Security Expert
11	Mr. Prashant Sharma	Fintech Expert
12	Advocate Prabin Subedi	Legal Expert
13	Er. Paras Rijal	Research Assistant
14	Er. Narendra Chaudhary	Research Assistant
15	Er. Sarina Shrestha	Research Assistant
16	Ms. Rasu Khadka	Research Assistant
17	Mr. Sabin Raut	Research Assistant
18	Ms. Samikchhya Neupane	Research Assistant

1.5 DELIMITATION

This study has been conducted to prepare 10 years E-GMP for Madhesh Province and thus the scope is limited to Madhesh Province. The sample agencies for data collection using questionnaire, KII, FGD and ICT stock taking were as mentioned in the Table 5, 6, 7 and 8 respectively (in Annexure 1) and limited to them. The sample size was guided by ToR and finalized in the inception phase against inception reports.


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CHAPTER 2 - REVIEW

The researcher has organized literature review using Theoretical Review and Technology Acceptance Model (Fishbein & Ajzen, 1975) (Davis, 1989). Relevant articles, constitution, acts, policies, guidelines, framework, master-plan and international cases has been reviewed.

2.1 GOVERNANCE

Governance refers to the system, processes, and practices through which a group of individuals or an organization exercises authority, makes decisions, and manages its affairs. It involves establishing and implementing policies, rules, and procedures to guide the behavior and actions of those in power or positions of authority.

In summary, governance refers to the structures and processes that guide the actions and behaviors of individuals or entities in positions of authority, aiming to achieve desired outcomes and ensure accountability and legitimacy.

As per Nepal National Governance Survey 2017/18, Governance Index of provinces are seen relatively lower. The Governance index of Madhesh Province is competitive in some and lower in some when compared with other provinces. E-Governance is suggested as a means to promote effective governance. E-GMP shall help in better e-Governance. (Nepal Administrative Staff College, 2017-2018)

2.1.1 E-GOVERNANCE

E-Governance enables citizens to access services and interact with the government at their convenience, reducing the need for physical visits and paperwork.

Citizen Participation: E-governance aims to engage citizens in decision-making processes and policy formulation by utilizing online platforms for consultations, feedback, and public discussions. It provides opportunities for citizens to express their opinions, contribute to governance, and hold the government accountable.

Data-driven Decision Making: E-governance relies on the collection, analysis, and utilization of data to inform policy decisions and improve service delivery. By leveraging data analytics and data-driven insights, governments can identify trends, monitor performance, and make informed decisions.

Efficiency and Automation: E-governance promotes automation and digitization of administrative processes, reducing bureaucratic hurdles and enhancing efficiency in government operations. It involves integrating various government departments and databases to streamline workflows and facilitate seamless information exchange.

Transparency and Accountability: E-governance fosters transparency by making government information, policies, and decisions readily accessible to the public. It enables citizens to track government activities, monitor expenditure, and hold officials accountable for their actions.

Overall, e-governance aims to transform traditional governance practices by leveraging technology to improve service delivery, increase efficiency, and enhance citizen engagement in the decision-making process.

2.1.2 E-GOVERNMENT

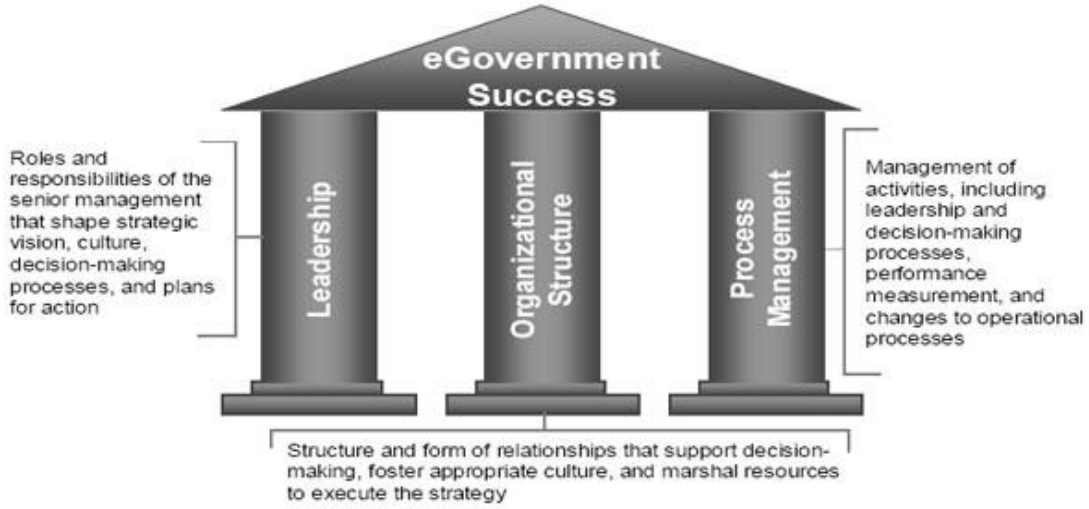


Figure 2 – The "Three Pillars" of e-Government (Georgescu, 2007)

E-Government is an electronic tools and technologies to improve and develop government activities and there transformation for serving legal persons of the state. In general words, it can be defined as sharing and delivering of national and local government services and information via internet or other digital means to citizens or other governmental organizations. (Gupta & Shakya, 2015)

E-Government uses digital tools and systems to provide better public services to citizens and businesses. Effective e-Government can provide a wide variety of benefits including more efficiency and savings for governments and businesses, increased transparency, and greater participation of citizens in political life (Europe Commission, n.d.).

Effectiveness of the E-Government enables effective decision making and the decision flows through three components – Leadership, Organizational Structure and Process Management as shown in Figure.2. Leadership is the leading or role or responsibility of senior management for strategic decision making and plans for action. Organizational structures are to form a relationship to support decision making, foster appropriate culture and build skills to marshal resources for execution of strategic plans. Process management is the management of measuring failure or success, leadership, decision-making and operational processes.

The main conditions for potential benefit of e-government are leadership, hardware availability, network connectivity readiness, software, business environment, human capital, privacy, trust and security, e-aware and e-ready population. Because of this, e-government initiatives must be

- efficient, integrated, results oriented, secured, private and transparent,
- focused on citizens and businesses,
- must be partnership-based. (Georgescu, 2007)

E-Government has been divided in different types for its easier study based on the triangle relationship model among government, citizens and business organizations such as Government to Government (G2G), G2B (Government to Business), G2C (Government to Citizen), B2G (Business to Government) and C2G (Citizen to Government), G2N (Government to Nonprofit) and N2G (Nonprofit to Government).

Stages of E-government:

E-government implementation passes various stages to reach its highest potential stage. (Irani, Al-Sebie, & Elliman, 2006). E-government implementation can't not be thought as one-stop process or execution of single project, it consists multiple stages and phase for development and execution, it is evolutionary in nature (UNPAN, 2023).

There are different e-government stages that has been proposed by many organizations and research. Below described is Gratner Group Model.

Gartner Group Model

The Gartner model outlines four phases of e-government maturity as shown below, but it is not necessary for all institutions to undergo all phases.

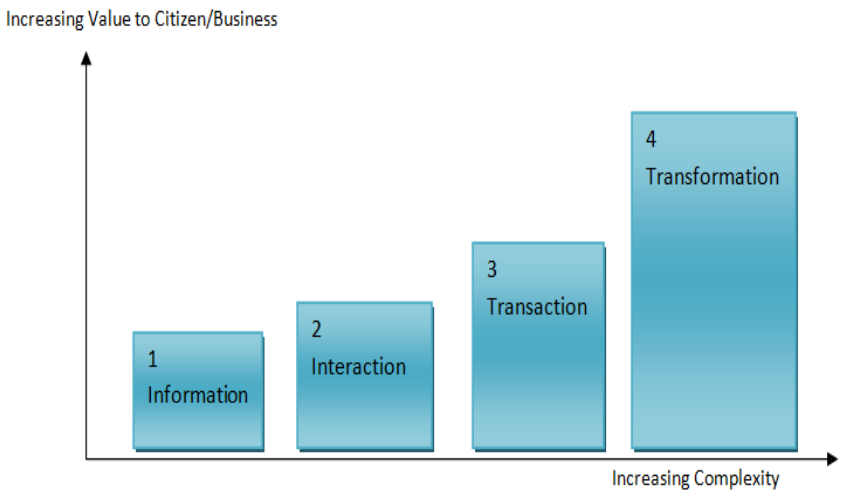


Figure 3 – E-Governance Maturity Model (Gartner, 2000)

Information: First Phase of e-government is being present on the web and provides the relevant information to the public. At this stage government information are publicly accessible, process are described which helps to become more transparent and finally improves democracy and good services. The government provides the information publicly via static website. G2C and G2B models actively participate in this stage. (Irani, Al-Sebie, & Elliman, 2006) (Fath-Allah, Cheikhi, Al-Qutaish, & Idri, 2014)

Interaction: Enable citizens to interact with government of services eg. Email, Chat room, Document Download, Feedback Form, Enquiry Form in online. It increases the participation and interaction between government and public. Internally (G2G) government organizations can communicate and interact via LAN, Email, and Online Chat etc. but this stage lack of online transaction. (Irani, Al-Sebie, & Elliman, 2006) (Fath-Allah, Cheikhi, Al-Qutaish, & Idri, 2014)

Transaction: At this e-government stage end user can perform the online transaction. It might be buying or selling goods, paying taxes and other fess. The complexity of technology increases and G2G services and other service have to be redesigned to provide good services. The best part of this stage is services are online including payment, verification, digital signature, etc. (Fath-Allah, Cheikhi, Al-Qutaish, & Idri, 2014)

Transformation: This is the fourth and last stage of e-government. All the online services are integrated, personalize. G2G, G2B, G2E, G2C all models are enabled and performing well. In this phase cost saving, democracy, participation, customer satisfaction, transparency, efficiency

and effectiveness reach the optimum possible level. (Karokola, Kowalski, & Yngström, 2011) (Irani, Al-Sebie, & Elliman, 2006)

2.2 E-READINESS

E-readiness is a measuring tool, which is used to evaluate the quality of ICT infrastructure at the nation level or in large sized organizations. It can evaluate the ability of consumers, businesses and governments to utilize ICT for their benefit (Kungwannarongkun, 2011).

E-readiness is generally defined as the degree to which a society as prepared to participate in digital economy with the underlying concept that the digital economy can help to build a better society (Krull, 2003).

A government that is E-ready is able to provide faster, more efficient, and more accessible services to its citizens, as well as promote transparency and accountability in its operations.

To assess the E-readiness of a government, several factors can be considered, including:

ICT infrastructure: This includes the availability and quality of ICT infrastructure such as internet connectivity, computer hardware, and software.

E-Governance Services: This refers to the availability and quality of electronic government services such as online portals, mobile applications, and e-payment systems.

Digital Literacy: This refers to the level of digital literacy among citizens and government officials, which affects their ability to access and use electronic services.

Legal and Regulatory Framework: This includes the existence of laws and regulations that support the use of electronic means for government operations and services.

Government Leadership and Commitment: This refers to the political will and leadership of the government to adopt and implement e-governance initiatives.

Overall, an E-ready government is better able to serve its citizens, promote transparency and accountability, and drive economic growth by enabling businesses to more easily access government services and information.

2.3 CONSTITUTION, ACTS AND RULES

Nepal Constitution 2072 is a basis for all law, acts, rules and thus is taken as a reference for E-GMP as well. E-GMP must follow areas, jurisdictions and authorities granted by Constitution to Province Government. Similarly, Madhesh Provincial Government (work division) Guidelines 2079, Electronic Transaction Act 2063 and Electronic Transaction Rule 2064 is reviewed.

2.3.1 NEPAL CONSTITUTION 2072

The Constitution of Nepal 2072 has been amended twice in 2016 and 2020. Nepal Constitution 2072 part 4 speaks about Directive Principles, Policies and Obligations of the State and part 5 speaks about Structure of State and Distribution of State Power. Schedule 4 defines 8 districts in the territory of Madhesh Province.

The Constitution of Nepal 2072, Schedule-6, 7, 9 defines "Provincial Powers", "Concurrent Powers of Federation and Province and Concurrent Powers of Federation" and "Province and Local Level powers".

2.3.2 MADHESH PROVINCIAL GOVERNMENT (WORK DIVISION) GUIDELINES 2079

Madhesh Provincial Government (Work Division) guideline was published using rights granted by Nepal Constitution 2074 with two annexures detailing work division for agencies under Madhesh Provincial Government. There are 11 Ministries formally endorsed by this guideline in annexure-1 such as (Madhesh Provincial Government, 2079)

1. Office of Chief Minister and Council of Ministers
2. Ministry of Finance
3. Ministry of Industry, Commerce and Tourism
4. Ministry of Energy, Irrigation and Water Supply
5. Ministry of Home Affairs, Communications and Law
6. Ministry of Land Management, Agriculture & Cooperative
7. Ministry of Physical Infrastructure and Development
8. Ministry of Forests and Environment
9. Ministry of Education and Social Development
10. Ministry of Health and Population
11. Ministry of Labor and Transport

The annexure-2 defines the work responsibility of the Ministries as defined in Annexure-1. Some clauses in work responsibilities of OCMCM such as 1, 3, 4, 8, 19, 20 are relevant to E-GMP (Madhesh Provincial Government, 2079)

- Short-Term, Mid-Term and Long-Term policy, plan and strategy formulation, approval, implementation, monitoring and evaluation of Provincial Government
- Work Delivery Guidelines formulation and monitoring for Provincial Government
- Work/ Service control, investigation, coordination, monitoring and evaluation for ministries at provincial level.
- Improvement of Governance, maintenance of good governance
- Human Resource development and management, Capacity development, scholarship management
- Assessment of Management and satisfaction survey of service seeker (citizens)

2.3.3 ELECTRONIC TRANSACTION ACT 2063

The Electronic Transactions Act, 2063 (2006) of Nepal came into effect on 2-Sep-2006 with the objective of ensuring the reliability and security of electronic transactions, including controlling unauthorized use of electronic records or alteration of such records through illegal means. The Act has several distinctive provisions related to electronic records, digital signatures, certifying authorities, and offences relating to computers, among others. (Electronic Transaction Act, 2063)

- Provisions Relating to Electronic Record and Digital Signature.
- Provision Relating to Dispatch, Receipt and Acknowledgement of Electronic Records.
- Provisions Relating to Digital Signature and Certificates.
- Electronic Record and Government use of Digital Signature.
- Offence related to computer

2.3.4 ELECTRONIC TRANSACTION RULES 2064

The Electronic Transaction Rules 2064 has following provisions

- Procedures of Electronic Record and Generation and Security of Digital Signature
- Provision relating to Digital Signature and Certificate.
- Provisions relating to Auditor and Audit of Performance
- Provision relating to Controller and Certifying Authority

2.3.5. UNBUNDLING REPORT

The "Unbundling/ Detailing of List of Exclusive and Concurrent Powers of the Federation, the State (Province) and the Local Level Provisioned in the Schedule 5, 6, 7, 8, 9 of the Constitution of Nepal" report was drafted by Federalism Implementation and Administration Restructuring Coordination Committee in Magh, 2073. The report was prepared by completing the unbundling of the works provisioned in the Constitution of Nepal to prepare the framework of the Federation, the State and the Local level organization structure as per the decision of the Directive Committee dated 2073/5/21. The report acts as a milestone of constitution implementation in which assignment of responsibilities and functions from the concurrent powers to the Federation, State and Local Level has been done coherently which supports additional study and analysis on the matters of formulation of organizational structure in each level. (Unbundling/Detailing of List of Exclusive and Concurrent Powers of the Federation, the State (Province) and the Local Level Provisioned in the Schedule 5, 6, 7, 8, 9 of the Constitution of Nepal, 2073)

2.4 POLICY REVIEW

Following policies were reviewed to align e-governance master plan along with aiming at transforming Nepali society into a knowledge and information-based society by leveraging Information and Communication Technology (ICT). The policy goals, objectives, and strategies are linked with the overall national developmental objectives, priorities, and programs such as the periodic development plans formulated by National Planning Commission. The policy intends to promote platform-neutral services in e-governance and increase citizen-facing government services online. The implementation of this policy shall take into account relevant regional and global strategies and best practices in transforming the nation into a knowledge-based society by cultivating strong linkages.

2.4.1 IT POLICY 2010

The Information Technology (IT) Policy of Nepal was formulated to achieve the objectives of making information technology accessible to the general public, building a knowledge-based society, and establishing knowledge-based industries. The government acted as a promoter, facilitator, and regulator, and high priority was accorded to research, development, and extension of information technology with the participation of private sectors. The policy aimed to develop competent manpower with the participation of both the public and the private sectors for the sustainable development and extension of information technology.)HLCIT , (2067

Domestic and foreign investment were encouraged for the development of information technology and the related infrastructures. The policy promoted the information technology industry and aimed to create a healthy and competitive atmosphere among information technology service providers. Computer education was to be incorporated into academic curricula starting from the school level, and professional efficiency was to be enhanced through the use of information technology.)HLCIT , (2067

The IT policy also aimed to extend the information technology network to rural areas and to place Nepal on the international market through information technology. The export of services related to information technology (software and hardware) was to be increased to **10 billion rupees** within the next **five years**, and Nepal was to be placed on the global map of information technology. E-commerce was to be promoted with legal provisions, and information technology was to be used to assist e-governance and for rural development.)HLCIT , (2067

The challenges faced by Nepal in implementing the IT policy were political instability, limited funding, and poor governance. The lack of political constancy deterred Nepal from effectively capitalizing on the promise unleashed by digital opportunities. Implementation of the IT policy slipped from the government's priority list due to scarce resources tied up in security efforts. Although the institutional provisions were put in place, the key implementing body was too under-resourced to effectively oversee implementation. The e-governance in Nepal was enhancing but still not fully developed. Therefore, learning from previous experiences, every aspect reflecting IT sector development was needed to be addressed (Techsansar, 2023)**.**

The policy highlights the importance of recognizing the diversity in Nepal and addressing the digital divide to ensure inclusiveness and regional balance. The policy encourages entrepreneurship and commercial use of the products of this diversity for economic development, job creation, poverty alleviation, and awareness and knowledge building. The policy sets a **three-year** deadline to create a suitable environment for development and ensure equality and inclusiveness of marginalized areas and citizens, such as **Dalits, tribals, women, and children.**

2.4.2 ICT POLICY 2072

The proposed ICT Policy of Nepal 2072 (2015) was intended to create foundational groundwork for an overall vision of “Digital Nepal”. As per this vision, Information and Communication Technology is a key driving force in transforming Nepali society into a knowledge and information-based society and strengthening Nepal’s pursuit of equality and

sustainable growth by leveraging Information and communication technology.)MoCIT, (2072

The implementation of this policy focuses on Government-led and Private Sector-driven, with public-private partnerships forming one of the bases for implementation, especially in matters and projects of national character and importance. The policy was primarily designed to guide and mainstream the use of ICT's in all sectors of the Nepalese economy within the overall context of socio-economic development and poverty reduction agenda pursued by the country.)MoCIT, (2072

The implementation of this policy shall take into account relevant regional and global strategies and best practices in transforming the nation into a knowledge-based society by cultivating strong linkages with the **UN Millennium Development Goals (MDGs)**, **WSIS beyond 2015**, **WTO**, **Broadband Commission, UN-ESCAP**, **post-2015 sustainable development agenda**, etc. Nepal continued to uphold the principle of freedom of expression on the Internet and net neutrality. The policy intends to promote platform-neutral services in e-governance.)MoCIT, (2072

The policy has set several goals for Nepal, including enhancing overall national ICT readiness with the objective of being at least in the top second quartile of the international ICT development index and e-Government rankings by **2020**, achieving digital literacy skills for **at least 75%** of the population by the end of **2020**, having a universal broadband access to all people on an equitable basis in place, with **90%** of the population able to access broadband services by **2020**, and ICT value-added accounting for **at least 7.5%** of GDP by **2020**.)MoCIT, (2072

By **2020**, the entire population of Nepal was targeted to have access to the internet, **80%** of all citizen-facing government services would be offered online, e-Procurement to be promoted as means of driving transparency through government procurement processes covering all public procurement of goods and services irrespective of cost and volume of such procurements by **2018**, **G2G** implementation would be promoted with a view to achieving complete automation of the operations of land administration, revenue administration and management, vital registration, passport and citizenship certificate services by **2020**, broadband access to be expanded across the country with the goal of achieving a broadband Internet user penetration rate of **30%** at a minimum of **512 kbps**, and making available **at least 10 Mbps** download speed on demand in

urban areas by **2018**. Special funding arrangements was needed to be developed and implemented within **2018** to support innovation and incubation of on-line businesses and start-ups (loksewajob, 2023).

2.5 GUIDELINES REVIEW

The published guidelines for website development, mobile app development, email IT system management and operation were studied to align development of E-GMP along with it.

2.5.1 WEBSITE DEVELOPMENT GUIDELINES 2078

The Ministry of Communications and Information Technology has 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. A recent directive published in the Nepal Gazette mandates that every government office must create and maintain its own website in accordance with the constitution and applicable laws. Moreover, the content uploaded and published on the website must not have any negative impact on any group, tribe, ethnicity, religion, or sect, and must not disrupt social peace and harmony. (MoCIT, 2078)

2.5.2 MOBILE APP DEVELOPMENT GUIDELINES 2075

For the implementation of mobile apps in government agency, **Mobile App Development Guidelines** have been proposed by Nepal Government. Establishing certain standards for mobile apps of government agencies and operating them has become necessary to manage the development of mobile apps across government bodies. (GoN, 2075)

2.5.3 EMAIL GUIDELINES 2075

This review aims to explore the email guidelines and best practices for the Nepal government and how can we relate the guidelines in the formulation of e-Governance Master Plan in Madhesh Province.

Nepal Government has made provisions for all government employees to be issued official email address and has mandated its compulsory use for all government offices and employees. This statement comes under the government directive named "**Government entities email management directives 2075**". The government has formulated the directives as per Article 69 in Electronic transaction rule. This initiation has made it clear that service delivery mechanism of the government has aimed to go paperless. (Threatnix, 2018).

- The domain for the government email is *mail.nepal.gov.np*, which cannot be hosted outside of Nepal.
- The government employees will have an email address of the following format: *firstname.lastname@nepal.gov.np*
- The email is only to be used for official government related subjects and not for personal use (Shrestha A. , 2018).

2.5.4 IT SYSTEM MANAGEMENT AND OPERATION GUIDELINES 2071

The Government of Nepal (Council of Ministers) approved the "Information Technology System (Management and Operations) Directives, 2071" to ensure consistency and standardization in the country's internal operations and public service delivery through information technology systems. These directives also aim to enable government agencies to access and utilize the information and services of other agencies as required. Additionally, the directives mandate the establishment of a Government Enterprise Architecture as a standard framework. These measures are deemed necessary to facilitate effective information technology management and operations within the government. (DoIT, 2023)

2.6 OWASP TOP TEN

The OWASP Top 10 is a standard awareness document for developers and web application security. It represents a broad consensus about the most critical security risks to web applications. Agencies should adopt this document and start the process of ensuring that their web applications minimize these risks. Using the OWASP Top 10 is perhaps the most effective first step towards changing the software development culture within your organization into one that produces more secure code. (OWASP Top Ten, 2023)

2.7 GOVERNMENT ENTERPRISE ARCHITECTURE (GEA)

GEA defines 8 frameworks from section 9 to 18 namely - Interoperability framework, e-Service framework, Data Exchange framework, Security framework, Infrastructure framework, Operation framework, Portal Reference Architecture framework and Digital Payment framework. GEA also has mandatory requirements for artifacts for ICT related projects with defined standards and formats. There are over 33 artifacts which can be adapted as needed. However, 15 of them are considered as mandatory based on the type of projects.

For internal applications, performance testing report is optional however for citizen centric application performance testing report is mandatory. Tool based performance Test report has to be attached with the artifact.

For Security Testing, Standard Tool based Security Test Report has to be attached with the artifact. Security Testing is mandatory for all applications before deploying in GIDC or any government cloud. (DoIT, 2016)

Table 6 – GEA Artifacts

SN	ARTIFACTS	WEB APP BESPOKE	MOB. APP BESPOKE	DESKTOP APP BESPOKE	PACKAGE/ PRODUCT IMPLM	COTS PRODUCT	PROCESS IMPROVEMENTS	INFASTRUCTURE	PROOF OF CONCEPT	SYSTEM ROADMAP	ASSESSMENT(SECURITY, EA)
1	Project Charter	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Mandatory	Mandatory
2	Project Management Plan	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory
3	User Requirements Specification (SRS/ FRS)	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Optional	Optional
4	Software Architecture Design Document	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Optional	Mandatory	Not Req.	Not Req.	Not Req.
5	Software Quality Assurance Plan	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Optional	Not Req.	Not Req.	Optional
6	Test Plans/ Test Cases	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Mandatory	Not Req.	Not Req.	Optional
7	Development/ Implementation Plan	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Optional	Mandatory	Not Req.	Optional	Not Req.
8	Code Review Checklist	Mandatory	Mandatory	Mandatory	Mandatory	Not Req.	Optional	Not Req.	Not Req.	Not Req.	Optional
9	Test Report	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Not Req.	Not Req.	Optional
10	User Manual	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Not Req.	Not Req.	Not Req.	Not Req.
11	Administrative/ Installation Manual	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Mandatory	Not Req.	Not Req.	Not Req.
12	Training/ Capacity Building Plan	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Not Req.	Not Req.	Not Req.	Not Req.
13	Security Testing Reports *	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Not Req.	Not Req.	Not Req.
14	Performance Test Summary Reports **	Optional	Optional	Optional	Optional	Optional	Optional	Optional	Not Req.	Not Req.	Optional
15	Support & Maintenance Strategy	Mandatory	Mandatory	Mandatory	Mandatory	Mandatory	Optional	Mandatory	Not Req.	Not Req.	Not Req.

2.8 DIGITAL NEPAL FRAMEWORK 2019

Nepal has achieved remarkable success in digital adoption in compared to Neighbors, with over 100% mobile penetration and 63% internet penetration. In 2017, approximately 2.25 million new internet users were added, which translates to an average of 250 new users every hour, according to the NTA. Nepal is expected to surpass major economies such as China and India in internet penetration by 2025 due to its growth trend in the coming years. (MoCIT, 2019)

The Digital Nepal framework has identified eight sectors, including digital foundation, agriculture, health, education, energy, tourism, finance, and urban infrastructure, through close engagement with stakeholders.

Total of eighty digital initiatives are identified which aims to enhance socioeconomic growth in Nepal by addressing crucial challenges while unlocking the growth potential in each of the eight key sectors. All identified 80 digital initiatives are discussed with all concerned stakeholders in workshops and feedback process setup by MoCIT. (MoCIT, 2019)

Table 7 – Digital Initiatives

Digital Foundation	▪ Establish the Internet as an essential service ▪ Improve spectrum availability, management and optimization ▪ Take the lead in 5G networks deployment ▪ National Optical Fiber Network ▪ High-speed internet connectivity for efficient delivery of Public services ▪ Special economic zones for ICT sector ▪ Government of Nepal App ▪ eGovernance 2.0 ▪ Paperless government to promote collaboration ▪ Public Wi-Fi Hotspots ▪ National Cyber Security Center ▪ Provincial Data Center Establishment ▪ National Language Computational Resource Pack ▪ National Biometric ID Card ▪ Digital Signature ▪ Digital Innovation and Co-creation Hub ▪ Digital Skill Development Initiative ▪ Government eLearning Platform ▪ ICT in Education ▪ eHaat Bazaar ▪ Precision Agriculture ▪ Agriculture Tools Sharing ▪ Digital Disbursement for MSP and Subsidies ▪ Digitization of Land Records

	▪ Smart Irrigation Project ▪ Smart Livestock and Wildlife Management ▪ Televet Medical Center Establishment ▪ Agriculture Input and Output Product Quality Tracking System ▪ Education and Training Programs and Farmers ▪ State of the Art Knowledge Centers and Government Agriculture Centers
Agriculture	▪ E-Haat Bazaar ▪ Precision Agriculture ▪ Agriculture tools sharing ▪ Digitization of land records ▪ Smart Irrigation project ▪ Smart Livestock & Wildlife Management ▪ Televet Medical Center Establishment ▪ Agriculture Input and Products Quality Tracking System
Health	▪ National Digital Healthcare Program ▪ Next-Generation Digital Healthcare Facilities ▪ Electronic Health Records 2.0 ▪ Mobile Health Units ▪ e-Maternal Care ▪ Drones for delivery of emergency medical supplies ▪ Centralized Telemedicine Center
Education	▪ Smart Classrooms ▪ OLE Nepal 2.0 ▪ Online Learning Platform ▪ Rent-a-laptop Program ▪ EMIS 2.0 ▪ Centralized Admission System ▪ Biometric Attendance Systems and CCTV Cameras ▪ Mobile Learning Centers in rural areas ▪ Tourist Security Infrastructure
Energy	▪ Smart Metering ▪ GIS Smart Grid Project ▪ Pan-Nepal roll-out of NEA-Any Branch Payment System (ABPS) ▪ NEA Official Mobile App 2.0 ▪ Smart Building/Energy Management Project ▪ NEA Field Force Automation Solutions ▪ NEA Customer Service Portal ▪ NEA e-Learning Platform ▪ Contract Management Information System

Tourism	▪ Welcome Nepal Website and Mobile App 2.0 ▪ Electronic Visas and Immigration Process Improvement ▪ Multilingual Helpline ▪ Augmented and Virtual Reality Tours ▪ Electronic Tour Guides ▪ Omni-channel Marketing
Finance	▪ National Payment Gateway ▪ Credit Ratings (Individual/Corporate Accounts) ▪ Information Management System for Nepali Migrants ▪ Policy interventions to allow Telecom Operators to offer mobile wallets ▪ Encourage digital payments in Nepal ▪ Development of single window for business and industry promotion ▪ Development and promotion of ecommerce and ITeS ecosystem ▪ Digital Payments Campaign
Urban Infrastructure	▪ Water ATMs ▪ Smart metering for water ▪ Intelligent Waste Management ▪ Automated Waste Sorting ▪ Municipality Mobile Application ▪ Connected Public Transport/Public Transport Mobile App ▪ Intelligent Traffic Management ▪ Intelligent Parking Lot Management ▪ Intelligent Toll Booths ▪ National Disaster Management System ▪ Disaster Management Training

2.9 E-GOVERNANCE MASTER PLAN (E-GMP)

The narrowed term e-Government when compared with e-Governance deals with the entire relationship spectrum and networks within government regarding the usage and application of ICTs. In general, E-Government deals with development of services that could be provided online to the citizen on any government services such as e-Tax, e-Transportation or e-Health etc. The Government of Nepal aims to

- become proactive,
- increase service levels and efficiency to constituents,
- maintain transparency,
- reduce operating expenses,
- concentrate on being service oriented,

- change view of citizens towards to government with trust and respect and enhance public services and quality of life
- encourage development
- Reduce vulnerabilities
- electronic communication between government officials and agencies. (NITC, 2016)

The main conditions for potential benefit of e-government are leadership, hardware availability, network connectivity readiness, software, business environment, human capital, privacy, trust and security, e-aware and e-ready population. Because of this, e-government initiatives must be

- efficient, integrated, results oriented, secured, private and transparent,
- focused on citizens and businesses,
- must be partnership-based. (Georgescu, 2007)

2.9.1 FEDERAL E-GMP

e-Governance Master Plan (2015-2019 AD): The e-governance master plan (2015 - 2019 AD) was prepared by Knowledge Holding International Pvt. Ltd. (KHint) in association with Information Technology Professional Forum (ITPF) drafted in July 2014. (KHint, ITPF, 2015-2019)

The entire project schedule was divided into four major phases viz. Preparation, As-Is Analysis, To-Be Model Establishment, Action Plan Formulation. In this master plan, different projects were classified according to different type of e-Government projects (G2C, G2B, g2G, Infrastructures, etc.) with goals, strategies, and programs. (KHint, ITPF, 2015-2019)

e-Governance Master Plan (2007- 2011 AD): The E-Governance Master Plan for the Government of Nepal was previously formulated by Korea IT Industry Promotion Agency (KIPA) working with the then High-Level Committee for Information Technology (HLCIT) for the years 2007- 2011. KIPA had signed a MOU with the then High-Level Commission for Information Technology (HLCIT) for the said task.

There were 33 projects recommended by the e-GMP. Out of these, 8 were selected to be implemented in the first phase of the action plan. They are: Groupware for Government, Government Portal, Enterprise Architecture, National ID, E-education, Communication Network, PKI and Integrated Data Center.

While the e-GMP prepared by KIPA could not be completely endorsed by Government of Nepal (GON), parts of the e-GMP recommendations have been followed. The following projects were formulated and implemented from the e-GMP so formulated with the consent of GON:

1. Korean International Cooperation Agency (KOICA) picked up the project of Government Integrated Data Center (GIDC) and implemented it.

2. Asian Development Bank (ADB) did a Grant Agreement with GON on 23 May, 2008 and called it an ICT Development Project with GRANT NUMBER 0106-NEP (SF) worth 25 million USD. The project was expected to be completed by 30 June 2014. (KIPA , 2007-2011)

2.9.2 E-GMP FOR GANDAKI PROVINCE

E-GMP for Gandaki province was published on 7-July-2021. The master plan has 235 pages among which followings are the identified e-service projects for the Gandaki Province. There were 60 projects listed altogether out of which 12 software/e-service projects were found with estimated budget of **NPR. 3,67,00,000.00**. The estimate on total proposed projects with their minimum budget allocation is around **NPR 13,27,00,000.00**+ which can be found in details in Annexure 1 Table 2. (OCMCM Gandaki, 2021)

They also have proposed a Data Warehouse with an estimated budget of NPR. 20,00,00,000.00 (Twenty Crores). The estimate with entire plan and implementation is **NPR 37,44,50,000.00**. (OCMCM Gandaki, 2021)

The master plan has well-defined plan with milestones for 5 years. However, the plan is overwhelming and thus failing to achieve any milestone might disrupt the entire 5 years plan. The optimistic budget expectation of **NPR.50,71,50,000.00** to achieve milestones in 5 years from Gandaki Province Government is seen challenging.

2.9.3 E-GMP FOR KOSHI PROVINCE

E-GMP for Koshi province was drafted on 2079. The master plan has 68 pages among which the identified e-service projects for the Koshi Province are as mentioned in the Annexure 1 Table 2. (OCMCM Koshi, 2023)

The master plan is focused on primary services that Koshi Province Government should focus on. Budget plan and milestone for these projects has not been proposed. Thus, achieving goal

with respect to time cannot be evaluated. Most of the proposed projects might contradict with e-services that Federal Government is already providing.

2.10 RELEVANT INTERNATIONAL CASES

Some international cases such as India and Srilanka were reviewed.

CASE 1: INDIA

The 'Digital India' Programme was launched by Ministry of Electronics and Information Technology (MeitY), Government of India with the vision to transform India into a digitally empowered society and knowledge-based economy by ensuring digital access, digital inclusion, digital empowerment and bridging the digital divide.

Digital India has considerably reduced the gap between the Government and citizens, making it easier for citizens to access services. The programme has also facilitated the direct delivery of services to beneficiaries in a transparent and corruption-free manner. India has emerged as a leading nation in leveraging technology to enhance the lives of its citizens. Digital India is a comprehensive initiative that encompasses several projects of various Federal Ministries/Departments as well as States/Union Territories. (Press Information Bureau, Government of India, Ministry of Electronics and IT, 2022)

Some of the major initiatives related to public service delivery are as follows:

- **Common Services Centers** – CSCs are offering government and business services in digital mode in rural areas through Village Level Entrepreneurs (VLEs). Over 400 digital services are being offered by these CSCs. So far, 5.31 Lakh CSCs are functional (including urban & rural areas) across the country, out of which, 4.20 Lakh CSCs are functional at Gram Panchayat level.
- **Unified Mobile Application for New-age Governance (UMANG)** – for providing government services to citizen through mobile. More than 1,570 government services and over 22,000 bill payment services are made available at UMANG.
- **e-District Mission Mode Project (MMP)**: e-District project has been implemented at district and sub-district levels of all States/UTs, benefitting all citizens by delivering various e-Services such as Certificates (Birth, Caste, Death, Income and Local Resident), Pension (Old Age, Disability and Widow), Electoral, Consumer Court, Revenue Court, Land Record and services of various departments such as Commercial Tax, Agriculture, Labour, Employment Training & Skill Development etc. Presently 4,671 e-services have been launched in 709 districts across India.

- **DigiLocker**: It is facilitating paperless availability of public documents. Digital Locker has more than 11.7 crore users and more than 532 crore documents are made available through DigiLocker from 2,167 issuer organisations.
- **Unified Payment Interface (UPI)** is the leading digital payment platform. It is integrated with 330 banks and facilitated over 586 crore monthly transactions worth over Rs 10 lakh crore has been facilitated for the month of June, 2022.
- **CO-WIN** - It is an open platform for management of registration, appointment scheduling & managing vaccination certificates for Covid-19. More than 203 crore vaccination doses and 110 crore registrations have been facilitated by co-win.
- **MyGov** – It is a citizen engagement platform that is developed to facilitate participatory governance. More than 2.48 crore users are actively using MyGov.
- **MeriPehchaan** – National Single Sign-on platform called MeriPehchaan has been launched in July 2022 to facilitate / provide citizens ease of access to government portals.
- **MyScheme** – This platform has been launched in July 2022 to facilitate citizens to avail eligibility-based services.
- **Direct Benefit Transfers** – 315 Schemes across 53 Ministries are offering Aadhaar enabled direct benefit transfer to citizens. So far, Rs 24.3 lakh crore has been disbursed through DBT platform.
- **Diksha** – Diksha is a national level educational platform that helps students and teachers to participate, contribute and leverage a common platform to achieve learning goals at scale for the country. As on 27th July 2022, 7,633 courses are available and more than 15 crore enrolments have been done.

Some of the major digital initiatives taken by the Government for welfare of farmers are as follows:

- **National Agriculture Market (e-NAM):** Government of India has launched National Agriculture Market (e-NAM) Scheme with the objective of creating online transparent competitive bidding system to facilitate farmers with remunerative prices for their produce. More than 1.73 crore farmers & 2.26 lakh traders have been registered on e-NAM platform. Also, 1000 mandis of 18 States and 3 UTs have been integrated with e-NAM platform.
- **M-KISAN** – mKisan Portal (www.mkisan.gov.in) for sending advisories on various crop related matters to the registered farmers through SMSs. In mkisan more than 5.13 crore farmers are registered for receiving crop advisories through SMS. More than 2,462 crore mobile based advisories have been sent to farmers to assist them in their farming activities.

- **One Stop Window**-Farmers Portal (www.farmer.gov.in) for dissemination of information on various agricultural related matter including, seeds variety, Storage Godown, Pests and plant diseases, Best Agricultural Practices, Watershed, Mandi details etc.
- **Soil Health Card** – It provides soil related information to facilitate farmers in farming activities. More than 22 crore soil health cards have been printed and dispatched to farmers.
- **Mobile based advisory system for agriculture & Horticulture (M4AGRI)** – It is mobile based advisory system for agriculture and horticulture. It has been implemented in the North-East States namely Tripura, Mizoram, Manipur, Meghalaya, Sikkim, and Arunachal Pradesh.

The Government has taken following steps in direction of data governance for socio-economic development in the country. The brief details are as follows:

- **Open Government Data** – To facilitate data sharing and promote innovation over non-personal data, Open Government Data platform has been developed. More than 5.65 lakh datasets across 12,800+ catalogues are published. The platform has facilitated 93.5 lakh downloads.
- **API Setu** – To facilitate data exchange among the system, API Setu has been developed as a platform. The platform has more than 2100 APIs, and 1000+ user organizations.
- MeitY has prepared the draft National Data Governance Framework Policy which aims to realize the full potential of India's digital government vision, maximize the efficiency of data-led governance & public service delivery and to catalyze data-based research and innovation. Currently the draft policy is under finalization. MeitY released the Draft National Data Governance Framework Policy on 26th May 2022 for public consultation. (Press Information Bureau, Government of India, Ministry of Electronics and IT, 2022)

CASE 2: SRILANKA

The concept of e-Governance in Sri Lanka dates back to 1983 when the Government recognized the need for ICT development by introducing the National Computer Policy. In 2003, the Information and Communication Technology Act No. 27 was established, which led to the creation of the Information and Communication Technology Agency of Sri Lanka. In 2004, the "e-Sri Lanka Development Project" was launched, with a focus on developing information infrastructure, improving human resources in ICT, delivering citizen-specific services, creating a modern government that utilizes ICT for social and economic development, and promoting Sri Lanka as a destination for ICT. Through the e-Sri Lanka initiative, Sri Lanka aims to leverage

ICT to reduce poverty and enhance the quality of life for its citizens by developing the country's economy. (Edward Francis Halpin, 2013)

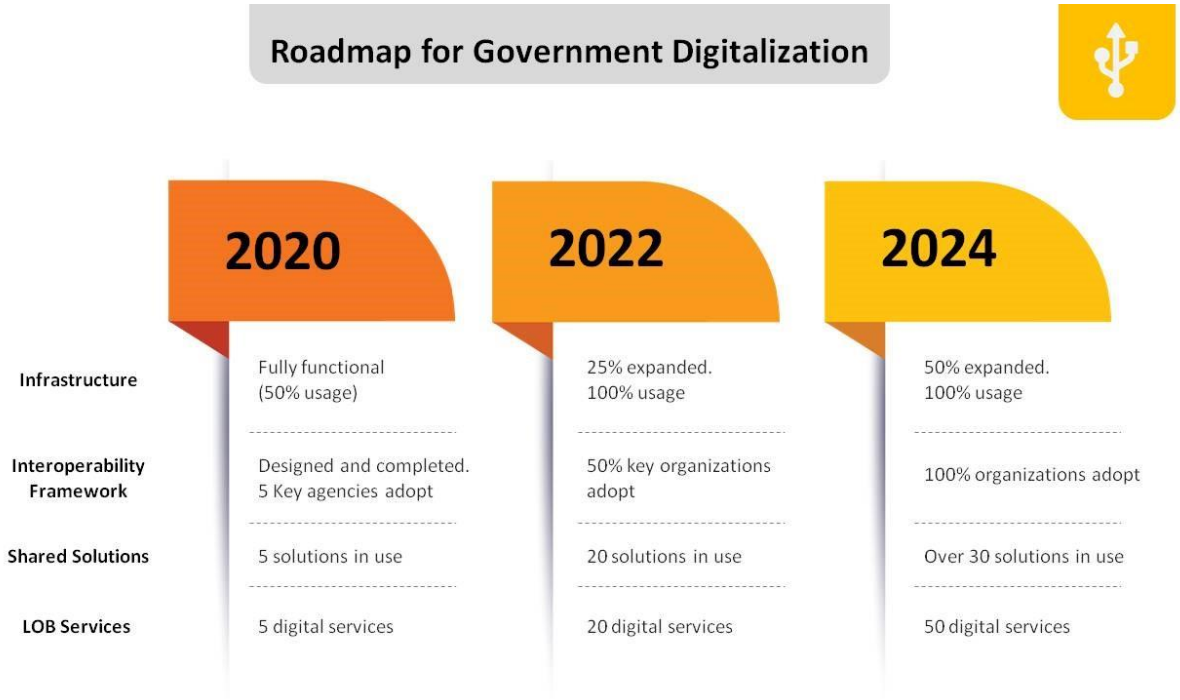


Figure 4 – Lanka Roadmap for Government Digitalization

The Digital Government Architecture planned for Sri Lanka aims to cater to the requirements of various customer segments (horizontal) through the implementation of shared solutions and Line of Business (LoB) solutions, which will be built on top of a strong foundation. This foundation will consist of a National Data and Identity Interoperability Platform (NDIIP), which is currently under development, as well as the Lanka Government Network (LGN) and the Lanka Government Cloud (LGC).

Lanka Government Network and Lanka Government Cloud (LGN/LGC) use secure and reliable infrastructure facilities to the government to host any type of application/ system and ensure government organizations, offices and buildings are connected with appropriate bandwidth to support the use of e-Government services by public servants as well as visitors to these offices. (ICTA , 2023)

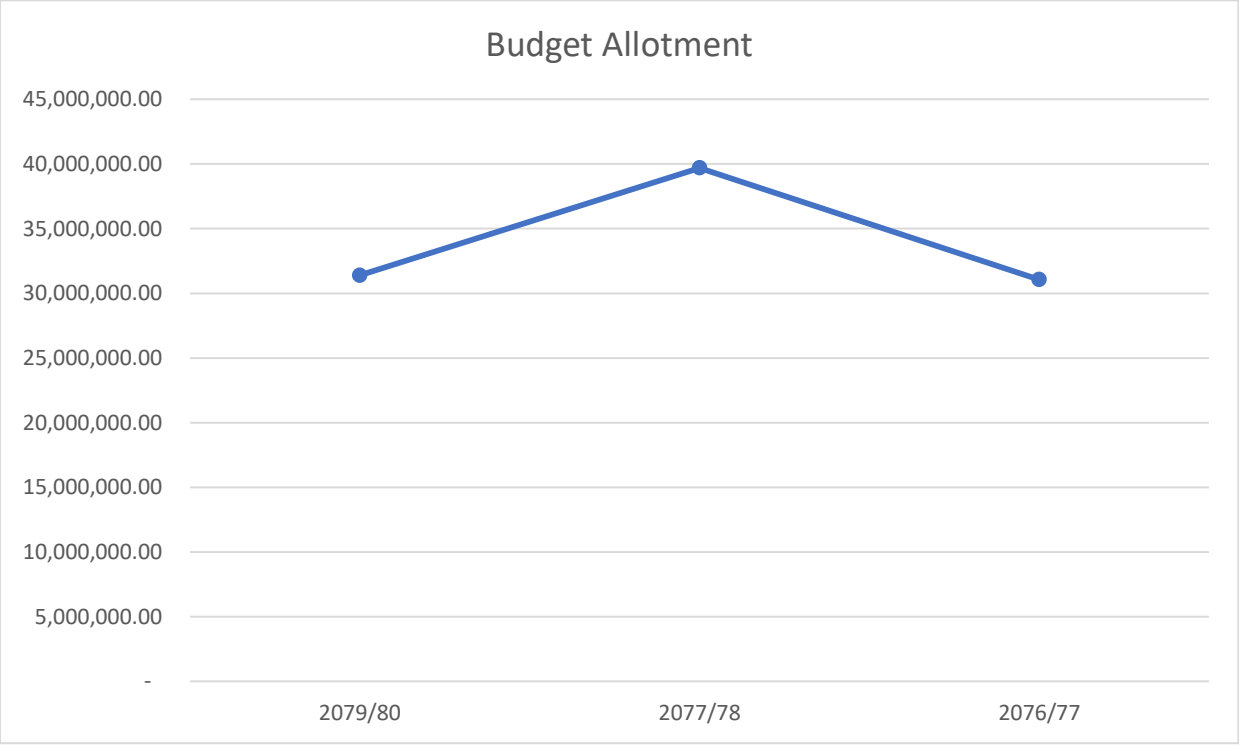
2.11 PLANNING AND BUDGETING (INVESTMENT)

Following are the Madhesh Province's planning and budgeting in the sector of IT and computer software for 3 fiscal years. (MoF Madhesh, 2079/80, 2077/78, 2076/77)

Table 8 – Planning and Budgeting for ICT domain (MoF Madhesh, 2079/80, 2077/78, 2076/77)

S.No.	Fiscal Year	Budget Allotment
1	2079/80	31,390,000.00
2	2077/78	40,582,000.00
3	2076/77	30,658,000.00

The above table and findings of budget allocation of Madhesh Province in IT sector for the three fiscal years indicate that there is an insufficient budget allocation in the IT sector of Madhesh Province.



Looking back at FY 2076/77 and FY 2079/80, it is found that there is no significant difference in budget allotment while the advancement of applications and software requires consistent investment and funding to keep up with technological advancements and meet the evolving needs of the province. Secondly, there is a lack of clarity regarding whether the expenses made in the IT sector align fully with the budget allocation for software applications.

Madhesh Province requires increased investment in ICT to drive digital transformation, improve e-governance, and deliver efficient public services. An ICT governing body can play a crucial role to oversee the budget allocation, monitor and track the utilization of funds in software applications. Furthermore, establishing clear guidelines and monitoring mechanisms can enhance transparency and accountability, ensuring that funds are utilized effectively for the development and advancement of software applications in the province.

CHAPTER 3 - RESEARCH METHODOLOGY

The research design is an important phase and basis of any research which when properly done, guides in collecting, organizing, analyzing, interpreting and reporting data (Creswell, 2003).

This research was conducted using mixed method – quantitative and qualitative in nature. The research design includes both **survey** (**quantitative**) and **interview/ observation** (**qualitative**) which was conducted institutionally with Ministries, Public Agencies and Public Institution, including government, academia and business and non-profits officials, predominantly involved in ICT study.

3.1 RESEARCH DESIGN AND METHODOLOGY

This research is guided by the TOR presented by client according to which mixed method was used where quantitative data collection was followed by qualitative data for further investigation. Key Informant Interview as conducted to find more relevant information for the development of E-GMP. Four separate sessions of focus group discussions were also conducted for further investigations. The draft report was created and finally stakeholders were invited for a consultative workshop where feedbacks were collected and final reports were presented.

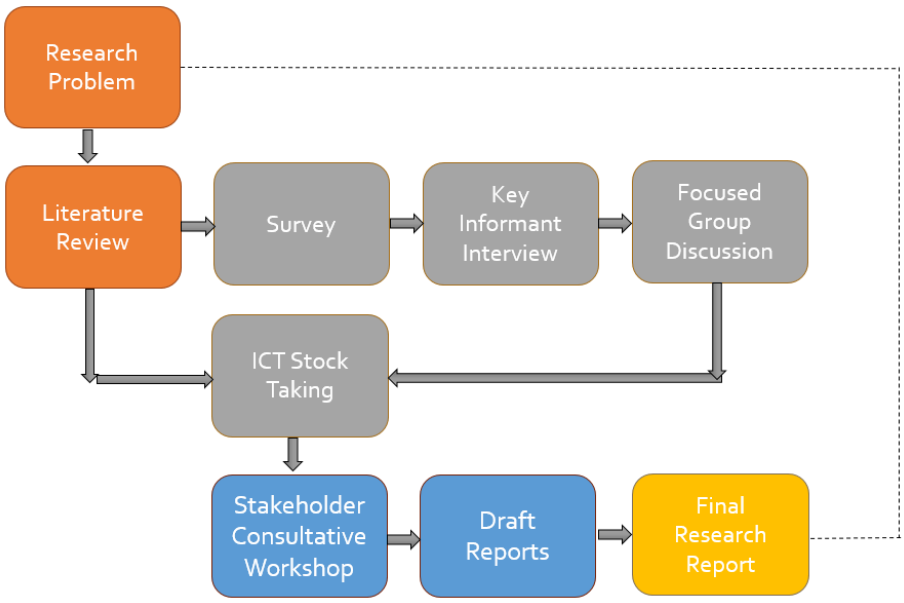


Figure 5 – Research Design

3.2 INDICATORS AND VARIABLES

There were altogether 6 indicators focused for this research.

Table 9 – Indicators and Variables

Indicators	Variables
Strategy & Policy	IT Leadership
	Future Plan
	ICT Plan & Policy
Technology	Software Infrastructure
	Hardware Infrastructure
	Network Access
Organization	IT Regulation
	ICT cooperation
	IT Management
	Digital Content
	Benefit
People	IT Awareness and IT literacy rate
	IT education & Training
	IT Qualification & Jobs
	Public Participation
	Job Satisfaction
Environment	Budget
	Non-IT Infrastructure
	Cost
	Political Priority and Management
Planning and Budgeting	ICT Activity Planning
	ICT Activity Budgeting

3.3 DATA COLLECTION

Primary Data collection was done using different methods such as survey, interview, focused group discussion which as directed by ToR. Secondary data collection was collected from published articles, guidelines, policies etc.

3.3.1 QUESTIONNAIRE SURVEY

Questionnaire Survey was conducted institutionally with Ministries, Public Agencies and Public Institutions including government academia, business and non-profit officials, predominantly involved in ICT study, design and delivery of e-services. The sample agencies were as mentioned in the below Table 5 in Annexure 1.

3.3.2 KEY INFORMANT INTERVIEW

Key Informant Interview was conducted to proposed persons as mentioned in the Annexure 1 Table 6 having rich understanding on ICT and e-governance process and systems in Nepal and across the world with using pre-approved checklist by OCMCM Madhesh Province.

3.3.3 FOCUS GROUP DISCUSSION

Next, 4 events with 5-7 people each for **Focus group discussion** was conducted with participants with high familiarity towards e-government programs and projects. The 4 events was segregated to 4 different groups as shown in below Table 7 of Annexure 1.

3.3.4 ICT STOCK TAKING

ICT Stock taking survey was taken in all provincial ministries and departments of Madhesh (as mentioned in Table 8 of Annexure 1), 5 urban municipalities (including sub-metropolitans and municipalities), 8 rural municipalities and 1 metropolis massively adopting e-governance services and using ICT infrastructure. (OCMCM Madhesh, 2023)

During the stock taking, four areas were segregated – Software, Hardware, Human Resources and Requirements.

CHAPTER 4 – ANALYSIS OF CURRENT STATUS

The data analysis results are as demonstrated below. The quantitative data were input to excel and results were driven as shown in Table 9 of Annexure 1. Similarly, analysis on KII, FGD and ICT Stock Taking has been presented below.

4.1 DESCRIPTIVE STATISTICS

The data collected for quantitative analysis was collected using closed ended questionnaire using Likert Scale. Likert Scale is a psychometric scale in research using questionnaires. (Likert, 1932)

The questionnaire was created primarily focusing 5 Indicators such as Strategy and Policy, Technology, Organization, People and Environment. There were about 55 questions to identify the status of Madhesh Provincial Government. 26 respondents submitted their survey. 2 respondents failed to answer as they did not have anyone responsible to participate in the survey (some resigned the job, some were transferred etc).

Table 9 in Annexure 1 depicts descriptive statistics on the survey made. The minimum score shows the least possible score given among all to the question and maximum score is the maximum score given among all respectively. The minimum score of 1 which denotes that there had been some respondents acknowledging that they need improvements in those sectors. It is obvious that agencies must have these at optimal level for better e-government, hence, finding 1 was awful. Similarly, the maximum of 5 was seen in a lot of questions, however, with an average analytics of all the respondents like a generalized perception, mean above 3 could be illustrated as above average. It can be seen for Strategy, Organization, People and Environment. And for Technology, it is seen to be needing improvements.

4.2 KEY INFORMANT INTERVIEW

Quantitative data analysis was followed by qualitative data analysis where KII was conducted to investigate and find relevant information to prepare E-GMP taking survey results as basis. Similarly, FGD was conducted to further investigate taking basis KII findings as basis.

Key Informant Interview was conducted to following proposed persons having rich understanding on ICT and e-governance process and systems in Nepal and across the world with using pre-approved checklist by OCMCM Madhesh Province.

The information from the Key-Informant-Interview was segregated into following sections such as Software, Infrastructure, Human Resources, Investment and Environment for better analysis.

4.2.1 ENVIRONMENT

DoIT being a body which oversees the ICT sector for federal government, there is also a need of similar body to manage ICT in provincial level. (Shrestha P. S., 2023)

An ICT department/ body having role similar to DoIT should be formed under every ministry which can oversee IT sector and such a dedicated body can commit to a systematic implementation of e-Governance in all levels of province. (Shrestha P. S., 2023)

There should also be a direct link-up between such provincial ICT body and federal DoIT which can co-operate with an aim to enhance the ICT sector of Nepal. (Shrestha P. S., 2023)

The involvement and participation of the private sector in e-government projects is of utmost importance (Shrestha P. S., KII: eGMP Formulation, 2023) (Risal, 2023). We can take examples of the existing applications developed by private organizations which are rendering satisfactory service to the government. (Shrestha P. S., 2023)

There is no point in bypassing the private organization in the development of e-government projects. In fact, in my opinion, the involvement of private section will aid in the sustainability of e-governance. We can witness the trend that many government projects funded by international organizations are developed by outsourcing while there are capable national companies who are deprived of such opportunities. Priority should be given to national human resources and IT companies so that the nation's manpower can be fully utilized and it can work for the upliftment of ICT sector of Nepal. Involvement of private IT companies, encouraging fair competition among capable national IT companies and creating an environment where government and private organizations go hand in hand for enhancing the ICT sector of Nepal is the best way to proceed as of now. (Shrestha P. S., 2023)

Through digital awareness programs, and exposure of application to citizens and time and again orientation and reach to citizens can encourage citizens and incline their interest towards e-governance. (Shrestha P. S., 2023)

The software development and the software training of government agencies is directly or indirectly dependent on private organizations. Both government agencies and private organizations should go hand in hand so that the nation’s manpower can be fully utilized for the upliftment of ICT sector of Nepal. (Dutta, 2023)

Madhesh Province is still lagging behind the e-governance and overall ICT infrastructures among other provinces and there's still a long way to go. A fundamental framework should be developed on the basis of which Madhesh Province can carry out its e-governance activities. (Risal, 2023)

The key areas that the Madhesh Province should focus on as of now are **develop ICT policies**, depute **an IT council or body** which can enforce all the government agencies to implement the e-governance services and monitor the agencies for their performance and activities. (Risal, 2023)

The present major challenge we have faced in implementing e-governance in Madhesh Province seems to be lack of readiness to adopt ICT technologies. This is due to change resistance and mentality to continue the as-is procedures in government agencies. For this, an IT body should be deputed which strictly can enforce all the government agencies to implement the e-governance services. (Risal, 2023)

Public engagement is crucial for the success of e-governance initiatives as it can help to promote transparency, accountability, participation, service delivery, trust, legitimacy, and policy outcomes. (Risal, 2023)

The software development and the software training of government agencies is directly or indirectly dependent on private organizations. Both government agencies and private organizations should go hand in hand so that the nation's manpower can be fully utilized for the up-liftment of ICT sector of Nepal. (Risal, 2023)

Public awareness and exposure to public about ICT technologies and e-governance can be an effective way to increase public engagement and thus strengthen the e-governance process in Madhesh Province (Risal, 2023) (Jha D. K., 2023). The systems and applications must have provision of easy accessibility by public. A system can only be successful only if there exists a transparency and trust among its stakeholders. Therefore, public should have an easy accessibility of the data and information in the system and applications which will increase the transparency, trust and legitimacy of e-governance process in Madhesh Province. (Risal, 2023)

Increasing public awareness about e-governance initiatives can be done by educating citizens, launching public campaigns, encouraging citizen engagement, collaborating with media, and designing user-friendly platforms, doing so governments can promote greater citizen participation in e-governance initiatives and improve overall governance. (Jha D. K., 2023)

As per current need, Madhesh Province has a long way to go for successfully implementing e-governance in every level. Capacity Development for e-governance is a pre-requisite for carrying out e-governance in Madhesh Province. Provincial government should focus on building the necessary skills, infrastructures, institutional structures needed for successful implementation of e-governance activities. Through training and education, infrastructure development, institutional reforms, citizen participation, and monitoring and evaluation, Madhesh Province can build a strong foundation for e-governance implementation and delivery. (Jha D. K., 2023)

Strong management vision, ethics, and dedication towards e-governance in Madhesh Province are crucial for the successful implementation and sustainability of e-governance initiatives. By developing a clear vision, fostering ethical values, ensuring effective leadership, and involving stakeholders, the province can build a culture of e-governance that is transparent, accountable, and effective. (Jha D. K., 2023)

For the formulation of ten years Master Plan for Madhesh Province, a vision of One-Door Policy should be incorporated in the plan. With one-door policy, citizens can access all government services through a single portal or platform, making it easier for them to navigate government services and reducing duplication and inefficiencies. Implementing a one door policy in e-governance can improve convenience, efficiency, transparency, integration, and accessibility of government services.

4.2.2 INFRASTRUCTURE

Regarding the data center in Madhesh Province, disparate opinions were received. Most of the interviewees supported the idea of building an autonomous data center in Madhesh Province while few of them disagreed about this claiming that Madhesh Province is still not technically capable of handling an autonomous data center so it is best to use the GIDC provided by federal government as of now.

Province should prioritize building an autonomous data center, multiple DR sites, and a cloud environment to strengthen its IT infrastructure and ensure reliable and secure delivery of e-governance services. (Dutta, 2023)

Madhesh Province can focus on achieving seamless connection and interoperability between different systems and services which can improve efficiency, reduce costs, and enhance the overall effectiveness of e-governance in the province. (Khanal, 2023)

Establishing government integrated support centers in Madhesh Province can be an effective way to improve access to government services and promote efficient and effective service delivery.

These centers can provide a centralized location for citizens to access a range of government services, including registration of births and deaths, issuance of identity cards, payment of taxes and fees, and processing of government permits and licenses. (Shah , 2023)

Video surveillance in Madhesh Province can be an important tool for effective e-governance, as it can help to improve public safety and security, prevent and detect crime, and support law enforcement agencies in their efforts to maintain law and order. (Bhattarai & Singh , 2023)

It is recommended to establish a Province Emergency Operation Center (PEOC) in Madhesh Province which can improve disaster preparedness, response and recovery. (Bhattarai & Singh , 2023)

Establishment of a 24x7 Security Operations Center (SOC) can help to ensure the security and reliability of Madhesh Province's e-governance systems, and should be a key priority for the province's IT strategy. (Shakya, 2023)

4.2.3 HUMAN RESOURCES

IT Industry promotion and expansion, Education and Generation of skilled manpower through technical education are they key areas to be focused on in the context of Madhesh Province. (Shrestha P. S., 2023)

The key areas that the Madhesh Province should focus on as of now are develop ICT policies and prioritize on technical education; assign an IT expert on each government agency and establish an IT body in Province which can monitor the overall ICT sector in Province level and work for the advancement of E-governance in Province. (Dutta, 2023)

Since, there is an absence of IT governing body, Madhesh Province should focus to cater the necessity of the separate ICT division in each Ministry of Province Government. Also, it is necessary to designate a dedicated high-level officer in the aforementioned ICT body for promoting e-governance in Madhesh Province. (Jaiswal, 2023)

Before establishing an autonomous data center, Madhesh Province is required to be self-sufficient in terms of technical capabilities and skilled human resources. As per current feasibility analysis, Madhesh Province is lacking human resources and technical capabilities and expertise. Putting this into consideration, it is not advisable for Madhesh Province to have its autonomous data center as of now. (Jaiswal, 2023)

Province government should consider deputing more skilled manpower in various technical positions of government agencies as implementation of e-governance will require more skilled human resources. (Shakya, 2023)

4.2.4 INVESTMENT

Madhesh Province Government can co-ordinate with federal government, collaborate on joint initiatives to access funding opportunities, seeking assistance. This can help provincial and local governments to build capacity, leverage resources, and enhance their e-governance initiatives. (Jha D. K., 2023)

4.2.5 SOFTWARE

Almost all participants had a common voice that the trend of haphazard application development needs to be ended. For that, province government should focus on using the pre-existing software applications provided by federal government. This will also aid in reducing the application duplication issues. The present applications which prove to be good examples and is strongly recommended to be implemented in Madhesh Province as well are CGAS, Budget Management System, Office Automation System, etc.

Integrated Task Management System/Office Management System is an example of prevalent project that helps to automate the manual workflow process of an organization. This system developed by federal government can be undertaken in provincial level as well. There are many existing federal level projects and ongoing applications which province can research upon, undertake it from federal level and implement in their province according to application suitability and requirement in each province (Shrestha P. S., 2023)

Before development of any system, the primary objective, purpose and function of system should be properly defined and the developed system should comply with the earlier defined objective. Most of the systems fail due to not being able to comply with the initial purpose of system development. In my opinion, by defining a proper objective and tracking whether the system complies with the defined objective, can aid in the sustainability of e-government projects. (Shrestha P. S., 2023)

Madhesh Province should prioritize developing e-governance applications in alliance with the Digital Nepal Framework to ensure interoperability and standardization of e-governance services, as well as to facilitate integration with other government agencies and systems. (Raut, 2023)

The provincial institutions, government agencies and local government should abide by the Interoperability Framework in developing applications which will reduce application duplication and supports uniformity. (Dutta, 2023)

The use of integrated software in e-governance can lead to improved service delivery, cost savings, better data management, enhanced citizen engagement, and increased collaboration across government agencies. By leveraging technology to integrate government functions and services, governments can provide better services to citizens and promote more efficient and effective governance. (Jha D. K., 2023)

Management Information Systems (MIS) related to industry, tourism, and forest management are essential in the context of Madhesh Province to promote economic growth, sustainable tourism, and effective forest management. (Jaiswal, 2023)

Madhesh government should focus on minimizing data redundancy which can improve efficiency and reduce errors in data management. "**One time data collection**" policy can help Madhesh Province to improve data quality, reduce errors, and enhance efficiency in data management. (Shakya, 2023)

Madhesh Government should have a database on all directorates, offices under a ministry. It should further have all information on its related line agency such as agriculture, farmers, barren land, cattle/ vaccination, outbreak on cattle/crops, farms, areas covered by different farms. Above all, a monitoring system is needed that could monitor and control redundant and repetitive grant being awarded to same farm/ land/ person or family. (Jha N. , 2023)

Also, data security can be a challenge thus GEA must be followed to maintain standards for compliance. Integration of all 3-Level: Federal, Provincial and Local government is must. (Chaudhary, 2023)

4.3 FOCUSED GROUP DISCUSSION

Focus Group Discussion (FGD) was conducted with participants with high familiarity towards e-government programs and projects. The entire FGD session was segregated into 4 phases and the dates are as mentioned below.

Table 10 – FGD Sessions

S.N	Session	Date	Venue
1	**FGD-1:** E-Gov Experts in Kathmandu	23-Apr-2023	Indreni Suites Hotel, Kathmandu

2	**FGD-2:** Madhesh Province Ministry Officials	25-Apr-2023	Hotel Rama, Janakpur
3	**FGD-3:** Municipalities CAOs of Madhesh Province	26-Apr-2023	Hotel Rama, Janakpur
4	**FGD-4**: Municipalities IT Officers of Madhesh Province	26-Apr-2023	Hotel Rama, Janakpur

The information from the Focus Group Discussion was segregated into following sections such as Environment, Infrastructure, Human Resources, and Software for better analysis.

4.3.1. Environment

Demand-driven digital strategies

Demand-driven digital strategies in e-governance for Madhesh Province would prioritize citizen-centric services, citizen involvement, data-driven decision-making, capacity building and training, and collaboration and partnerships. These strategies would ensure that government initiatives are responsive to the needs and demands of the citizens, and effectively leverage digital technologies to improve governance and service delivery in Madhesh Province.

Umbrella Framework

In the present context, an Umbrella Framework seems to be of paramount importance; all the federal government can carry e-governance over a common baseline maintaining coherence, consistency and alignment. Umbrella framework is a holistic approach that brings together various levels of government, including the federal, provincial and local levels under a unified framework for better service delivery, to promote digital inclusion and foster good governance practices.

Implementation of GEA framework and Interoperability Framework in Madhesh

GEA emphasizes the need for standardization, integration, and interoperability of ICT systems and solutions in the government sector to ensure efficient service delivery and governance.

Interoperability framework provides guidelines, principles and standards for ensuring the ability of different information systems and technologies to exchange and use data and information in a seamless and efficient manner.

Ecosystem

It is necessary to create an ecosystem that includes security, a platform-based strategy, the mapping of a federal agency to a province, and traditional issues like technology management with a public-oriented service delivery focus.

Plans and Policies

Dedicated regulations and law can be implemented which defines the principle of e-Government activities and provision of e-Governance to clarify each role of key organizations in formulating eGovernment.

Implementation of relevant plans and policies related to IT such as: **Digital Nepal framework** (2018), IT policy (2010) and other relevant regulations, programme, etc. should be done at provincial and local level.

Madhesh Province can follow the **e-Governance Blueprint** developed at national level.

Service Prioritization:

There seems to be requirement of service prioritization for **G2G, G2B and G2C**. It is necessary to implement the systematic shared service, common service and unique service of G2G, G2B and G2C.

Communication and Collaboration:

A sound communication and collaboration between Federal Government, Provincial Government and Local Government is the way to create a sustainable and effective e-governance in Nepal. Co-ordinate with higher level government, collaborate on joint initiatives, access funding opportunities and seeking assistance can help local governments to build capacity, leverage resources, and enhance their e-governance initiatives.

Data sharing and interoperability:

There is a need for a standardized data sharing framework that specifies the protocols, standards, and data formats that need to be followed. This framework should also ensure the security, privacy, and confidentiality of the data being shared.

Improving data sharing and interoperability in Madhesh Province requires a collaborative effort involving various stakeholders. A standardized data sharing framework, capacity-building initiatives, and political will and commitment are essential for improving data sharing and interoperability in the province.

Interoperability and Data Sharing framework is possible only if "**Only Once**" policy is enacted in Nepal Government Act. This means the citizens' personal data should be collected just once in national level. The accessibility of thus integrated data/systems can be done via one-stop solution.

Focus on Software Literacy and Awareness

Implementing training programs on software literacy and awareness can help citizens in Madhesh Province to develop the necessary skills and knowledge to effectively utilize technology. Basic computer skills, cybersecurity, open-source software, and online training programs are some of the areas where training programs can be focused.

Increase public-engagement in e-governance at local level:

Local governments can increase public engagement in e-governance which can improve transparency, accountability, and responsiveness to the needs and concerns of community, and build trust with the community. Here are some ways to increase public engagement in e-governance:

- ✓ Develop user-friendly e-governance platforms
- ✓ Educate citizens about e-governance
- ✓ Solicit feedbacks from citizens through surveys, public forums, and online feedback mechanisms
- ✓ Use social media to engage citizens
- ✓ Create citizen advisory groups

4.3.2. Infrastructure

Need assessment

A comprehensive need assessment would pinpoint all the interventions point and actual needs of the stakeholders of the Madhesh Province. The lack of physical infrastructure in municipalities should be addressed by supplying laptops, computers, and other necessary resources in accordance with each organization's assessment of its needs.

Perspective on Data Center

Before establishing an autonomous data center, Madhesh Province is required to be self-sufficient in terms of technical capabilities and skilled human resources. As per current feasibility analysis, Madhesh Province is lacking human resources and technical capabilities and expertise. Putting this into consideration, it is not advisable for Madhesh Province to have its autonomous data center as of now.

An alternative solution could be to use cloud computing services provided by trustable cloud service providers. Cloud computing can provide a cost -effective and scalable solution for data storage and management without requiring the same level of technical capabilities and resources.

In the present context, it may be more feasible to collaborate with the federation GIDC server to meet the data storage and management needs of the province.

4.3.3. Human Resources

Need of skilled human resources

As per current need assessment of Madhesh Province, there is an urgent need for skilled human resources related to IT and e-governance. For this, the Madhesh government and concerned stakeholders should look into this matter and appoint proficient human resources and cater the need of skilled human resources. Madhesh government should prioritize in production of skilled human resources and utilization of local resources to the optimum level.

Need of IT governing body

Since, there is an absence of IT governing body, Madhesh Province should focus to cater the necessity of the separate ICT division in each ministry of Province Government. Also, it is necessary to designate a dedicated high-level officer in the aforementioned ICT body for promoting e-governance in Madhesh Province.

Proficiency and Capacity Building

Proficiency and capacity building of government employees in IT sector is required which can be done by developing a comprehensive human resource development strategy, providing training and professional development opportunities, and collaborating with the private sector and non-governmental organizations.

Need assessment

A comprehensive human resource need assessment would pinpoint all the interventions point and actual needs of the stakeholders of the Madhesh Province. The existing need for human resources can be brought to light which can aid in the appointment of qualified technical officers in the technical positions of the government agencies.

Need of operational staffs in government organizations

The current assessment shows that government organizations in Madhesh Province require sufficient number of skilled operational staff for their effective functioning. Provincial government should focus on deputing IT officers, technicians, computer operators and such operational staffs in government agencies.

4.3.4. Software

Need assessment

A comprehensive software need assessment would pinpoint all the interventions point and actual needs of the stakeholders of the Madhesh Province. The existing need for software applications can be brought to light which can lead to emergence of numerous projects.

E-Government Initiatives

Madhesh should focus on promoting and implementing e-governance initiatives, including the use of cloud computing technologies, to improve service delivery, transparency, and efficiency in government operations.

Improve functionality and public engagement in government-provided websites

Nepal Government has developed websites for ministries of all provinces of Nepal. (Nepal Government , n.d.)Having dedicated websites for each ministry can provide citizens with easy access to information about the services offered by each ministry, as well as updates on government initiatives and policies. However, it is important to ensure that these websites are public-interactive, user-friendly, accessible, and up-to-date.

Enhancing existing government-provided websites through more public interaction can improve the website's functionality and effectiveness in delivering government services and information.

Demarcation of usage of federal software and provincial software

The demarcation of usage of federal software and provincial software requires clear guidelines and policies, assigning responsibilities, ensuring compatibility, monitoring usage, providing training, and regular review.

Optimum utilization and implementation of existing software applications

There are numerous such applications in Madhesh Province that have not yet undergone the implementation phase. Applications that are ready for deployment should be implemented with clear instructions and guidelines and existing applications should be used in an optimum level.

Avoiding the vendor-driven approach:

The provincial and local government may consider stopping the vendor-driven approach in software development to improve their control over the control over the quality of the software being developed, reduce costs, increase transparency, and better customize the software to meet their specific needs.

Application and Data Integration

Madhesh should focus on Application and Data Integration which will integrate the existing systems, prevalent data and thereby reduce the application and data duplication. One of the major issue can be seen in applications like Transport/ Land Registration etc

Focus on building a uniform, centralized ecosystem of software applications:

There exists a prevailing disparity in usage of systems and applications by municipalities. There is an absence of uniformity in software applications used in municipalities. The total applications which are currently in use are:

- Electronic Building Permit System
- Sutra Accounting Software
- Public Assets Management System (PAMS)
- Provincial Budget Information System (PLMBIS)
- Online Citizen Charter, School Management System
- Electronic Fund Transfer
- Tax Record System
- E-attendance System
- Personnel Management System

- E-bidding System
- Online Municipal Court
- Online Vital Registration System
- Own mobile applications

It is promising to see that some municipalities are taking e-governance initiatives by bringing such applications into implementation. On the other hand, it is disappointing to see some of the municipalities are lagging behind and are not familiar with such existing applications.

This brings out to a strong recommendation that there should be a centralized set of such pre-defined applications which must be mandatorily used by all the municipalities. Doing so can reduce the application duplication, mismanagement of applications, disparity in usage and bring a uniformity in software applications used in Madhesh Province.

4.4 ICT STOCK TAKING

ICT Stocktaking was done to identify current ICT stock status at Madhesh province. The stock taking was segregated to following 4 categories for easier studies – software, hardware, human resources and requirements. The data was taken from provincial ministries, departments and municipalities as mentioned in the Table 8 of Annexure 1. The data collected for software are in Table 11, for Infrastructure are in Table 12, for Human Resources are in Table 13 and for Requirements are in Table 14 of Annexure 1.

4.4.1 INFRASTRUCTURE

Computer Hardware: Most of the government agencies possesses computer hardware setup, including workstations, laptops and peripheral devices. The majority of hardware components are in working conditions, with a maintenance schedule as needed. However, some older devices may require upgrades to meet the growing demands of the agencies operations. Around 49 computers were found to be with i3 CPU and 4 GB RAM which might need upgradation or replacement based on their individual performance or usage.

Server: Most of the agencies were found to be using NITC/GIDC servers.

Network/ Internet: Most of the sampled government agencies were found to be using 50-80Mbps connection. However, their performance was not seen as committed bandwidth in some agencies as a result of which it is seen to deficit work performances.

Surveillance: Most of the agencies were found to be using CCTV Surveillance systems, however, neither standard system nor centralized system were found to be adapted.

Attendance Device: Attendance Devices were seen in most of the agencies, however, its full utilization was not seen.

4.4.2 HUMAN RESOURCES

ICT Officials positions were defined in all agencies. Most of the ICT Officials were found from non-ICT background. A skills gap within the human resources team to identify areas for improvement was seen. A comprehensive training and capacity-building program to enhance ICT skills and knowledge is needed. The vacant IT designations/positions were found in some agencies. ICT higher level officials were not found, thus, lack of ICT leadership was found. This Human Resources stocktaking highlights the strengths and areas for improvement in the ICT capabilities and resources within the agencies of the Madhesh Province. The ICT HR needs to enhance its ICT infrastructure, skills, and capacity to effectively support the E-Government initiatives and contribute to the overall success of the Master Plan.

4.4.3 SOFTWARE

Most of the agencies were found to be using Federal systems efficiently. All agencies were found to be using independent websites and some agencies did not have proper SLA with the vendor. Some systems such as Project Performance Information System (PPIS), Inventory Management Information System (IMIS), Contract management Information System (CMIS), Office Automation System, Beti Padhau Beti Bachau (BPBB), Personal Information System (PIS) etc were found to be developed by Madhesh Provincial Government but they were not seen to be dependable and utilized at full.

Many of the agencies wished to have an automated system for incoming and outgoing letters, tippani etc. Some agencies wished to have local data center under MPG.

4.5 ICT BUDGETING

The analysis of budgeting data for the years 2076/77, 2077/78, and 2079/80 reveals a following trend in the allocation of budget in the ICT sector for following agencies. The budget allocation to Capital Expenditure is seen to be declining in the figure below which evident that ICT is not being prioritized. The decline in budget allocation for Working Capital Expenses can evident that expenses for existing system maintenance is not being prioritized. (MoF Madhesh, 2079/80, 2077/78, 2076/77)

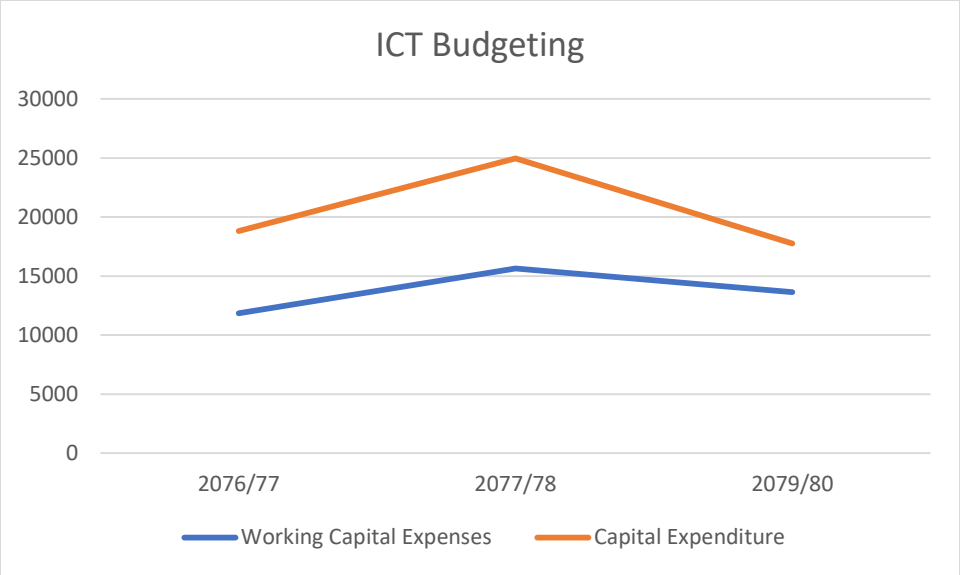


Figure 6 – ICT Budgeting Analysis (MoF Madhesh, 2079/80, 2077/78, 2076/77)

The table below depicts data for ICT budget planning for FY 2076/77, 2077/78, and 2079/80. Out of 64 agencies as mentioned in the red-book, ICT budget has been assigned to only 32 agencies in one (or more) of three FYs.

Table 11 – ICT Budgeting (MoF Madhesh, 2079/80, 2077/78, 2076/77)

Agencies	2076/77		2077/78		2079/80	
	WCE	CE	WCE	CE	WCE	CE
Provincial Assembly	0	0	370	800	480	0
PPSC	580	1300	0	500	300	3100
OCA	0	600	0	900	360	0
OCMCM	5000	9000	1440	5300	5336	6300
MOF	0	0	0	0	360	2000
PLGSP	0	0	0	0	0	388
OCMCM Sangh Anudaan	150	0	0	0	0	0
MoF	288	300	720	900	0	0

PTCO	1800	1800	1800	3265	240	2000
MOITFE	1320	0	1380	3300	780	1500
Division Forest Office	0	0	0	300	0	0
Upavokta Heet Samrachyann Nirdeshnalaya	0	0	120	0	240	0
MoLAC	0	0	0	824	0	0
Directorate of Agriculture Development	0	0	400	0	100	0
Krishi Bebashaya Prabardhan Sahayog Tatha Talim Kendra	50	0	150	0	0	0
Uusna Pradeshayea Baghbani Kendra, Janakpur	150	0	170	0	0	500
Agriculture Knowledge Center	0	0	0	2550	0	375
Animal, Poultry and Fisheries Development Directorate	400	0	900	0	100	0
Fisheries Development Center	0	0	500	0	0	0
Veterinary Hospital and Livestock Service Expert Center	0	0	5500	0	451	0
MOHAC	0	0	0	0	1000	0
MOWSE	0	0	0	0	400	500
MoIAL	120	3000	300	1500	0	0
MoPID	2000	0	1200	0	2180	450
Department of Water Supply and Sewerage Management	0	2000	0	0	0	0
MoSD	0	0	500	3600	300	150
Employment Information Center	0	600	0	0	500	0
MoSD (Sangh Sasarta Anudhan)	0	0	180	0	0	0
Education Development Directorate	0	0	0	0	500	0
Education Training Center	0	0	0	550	0	0

Province Health Supply Centre	0	200	0	0	0	0
PPPC	0	0	0	663	0	500
Sub Total	11858	18800	15630	24952	13627	17763
Grand Total	**3,06,58,000**		**4,05,82,000**		**3,13,90,000**	

CHAPTER 5 - RESULT AND ANALYSIS

The research showed current scenario of the Madhesh province in terms of the area of existing e-services, ICT domain, legal status, existing plans and policies, infrastructure development need, human resource management, data and information management. This research has identified and prioritized areas as shown in the next chapter where it recommends institutional setup, legal and policy arrangements for operationalizing e-Governance system. The goals of E-GMP as mentioned in next chapter when successfully implemented shall provide efficient, effective, transparent and user-friendly governance in Madhesh Province.

For the result and analysis, the current scenario of Madhesh Province in terms of existing e-services can be broadly classified into five key-areas. The results and findings obtained from study and analysis of current situation of Madhesh Province has been explained below in 5 key-areas:

5.1 ENVIRONMENT

As per current need assessment, Madhesh Province has a long way to go for successfully implementing e-governance in every level. Capacity Development for e-governance is a pre-requisite for carrying out e-governance in Madhesh Province. Provincial government should focus on building the necessary skills, infrastructures, institutional structures needed for successful implementation of e-governance activities. Through training and education, infrastructure development, institutional reforms, citizen participation, and monitoring and evaluation, Madhesh Province can build a strong foundation for e-governance implementation and delivery.

The present major challenge Madhesh Province is facing in implementing e-governance seems to be **lack of readiness** to adopt ICT technologies. This is due to **change resistance** and mentality to continue the as-is procedures in government agencies. Resistance to change and traditional mindsets can impede the adoption of e-governance practices. Some government officials and citizens may be reluctant to embrace digital technologies, preferring traditional methods of service delivery.

Lack of software competence and digital literacy is another lagging factor which is observed through the elaborative research and study of Madhesh Province. Madhesh Province is facing challenges in terms of software competence and IT expertise in various technical positions of government agencies.

There seems to be an **absence of ICT policies and guidelines** and **an IT governing body** which can establish clear guidelines and monitoring mechanisms to enhance transparency and accountability, ensuring that funds are utilized effectively for the development and advancement of ICT in the province. However, the existing guidelines such as website development guidelines, mobile app development guidelines, Government Enterprise Architecture provides guidance in developing and implementing ICT systems.

The rights granted to Province-level government and LG to exercise their power as per unbundled reports or Schedule 6, 7 and 9 provides enough rights to improve ICT environment.

Lack of public awareness and exposure to public about ICT technologies and e-governance is observed in the current scenario of Madhesh Province. Promoting public awareness and providing exposure to ICT technologies and digital literacy can serve as a powerful means to enhance public engagement and, consequently, reinforce the e-governance process in Madhesh Province.

The involvement and participation of the private sectors in e-government projects is very crucial. The software development and the software training of government agencies is directly or indirectly dependent on private organizations. Madhesh government should consider public-private partnerships, collaborating with NGOs/INGOs in order to optimize local talent and fully utilize the qualified human resources to bring out new innovations and advancement in the ICT sector of Madhesh.

The lagging factors in the Madhesh Province in terms of e-governance can be attributed to **lack of public engagement, digital literacy, e-readiness challenges, lack of ICT policies and their implementations**.

5.2. INFRASTRUCTURE

Based on the research and study to assess the Madhesh Province's infrastructure situation including various key informant interviews, focus group discussion with ministries and municipalities chief and IT representatives, ICT Stock taking of multiple ministries, municipalities (metropolitan, sub-metropolitan, urban, rural municipalities), some challenges have been identified in the effective implementation of e-governance in Madhesh Province in terms of infrastructural development. In light of this, it is essential for all the agencies to become self-sufficient in terms of infrastructures to enable them to carry out their operations seamlessly.

Internet/ Network: It is unappealing to find out that many government agencies are still having the requirements of basic infrastructures. We recognized that not all government agencies in

Madhesh Province have access to stable internet connectivity, which can be a significant challenge in implementing the e-governance activities.

The key areas of infrastructures that the Madhesh Province should focus on are the network connectivity, hardware infrastructures including computer systems, servers, IT equipment and physical infrastructures like proper workplace for employees.

Data Center: Before establishing an autonomous data center, Madhesh Province is required to be self-sufficient in terms of technical capabilities and skilled human resources. As per current feasibility analysis, Madhesh Province is lacking human resources and technical capabilities and expertise. Putting this into consideration, it is not advisable for Madhesh Province to have its autonomous data center as of now.

As a result of the overall findings, it is recommended that Madhesh Province invests in improving the required infrastructure of government agencies. This could involve helping all agencies to be self-sufficient in terms of infrastructures, assisting them to optimize the available resources and infrastructures, developing a robust internet infrastructure, providing training on internet usage and security, and exploring alternative connectivity options.

The key areas of infrastructures that the Madhesh Province should focus on are the network connectivity, hardware infrastructures including computer systems, servers, IT equipment and physical infrastructures like proper workplace for employees. Considering the deficient technical expertise and lack of skilled human resources, it is not advisable for Madhesh Province to have its autonomous data center as of now.

5.3. HUMAN RESOURCES

Lack of skilled human resources with willingness in government agencies of Madhesh Province has been identified as a major barrier in the implementation of e-governance activities. As per current research and study in most of the government agencies of Madhesh Province, it was found that there are a significant number of vacant technical positions in government offices and there also seems to be a lack of willingness and readiness to work in Madhesh Province. As a result, there is a lack of qualified personnel in technical positions and this resulted in recruiting non-technical background personnel in the technical arena in government offices. There are very few ICT related activities such as development or implementation of the system, trainings being done. Most of the ICT staffs are found to be doing regular data entry jobs as a result of which motivation-to-improvement or willingness seems to be lower.

In addition to this, there is an **absence of IT governing body in Madhesh Province** which oversees all the IT-related activities. Without an IT governing body, there is a lack of coordination and collaboration among different government agencies responsible for implementing IT-related projects. This results in duplication of efforts, inefficiencies, and delays in project completion. Moreover, there is no federal authority responsible for ensuring that IT projects are aligned with the overall objectives and priorities of the province.

A significant number of vacant technical positions in government offices, lack of willingness and readiness to work in Madhesh Province, absence of IT governing body and as a result recruitment of non-technical background personnel in technical field are some of the key findings from the study of human resources sector of Madhesh Province.
The key areas that the province government is recommended to prioritize are deputing more skilled human resources in various technical positions of government agencies, assign at least an engineer, data operator and IT officer in each government agency, establish an IT governing body, develop ICT policies and prioritize on technical education, provide training on software literacy and professional development opportunities.

5.4. INVESTMENT

As per our research and study, it is observed that the **budgetary allotment vs. expenditure** falls short of what it ought to be in terms of IT sector in Madhesh Province. This lack of investment in IT infrastructure, human resources, and essential IT sectors is a significant challenge in enhancing the IT domain in Madhesh Province.

Without sufficient budget allocation, it becomes challenging to implement IT-related projects effectively, efficiently, and in a timely manner. This leads to delays in project completion, lower quality outputs, and a significant lag in the IT domain in the province. Moreover, the lack of investment in human resources and essential IT sectors like hardware, software, and network infrastructure creates a shortage of qualified staff and impedes the growth of the IT sector.

The budget allocation should prioritize in the areas of **IT infrastructure, Human Resources, Capacity Building, Research and Development, Public-Private Partnerships.**

By increasing the budget allocation for the IT sector, Madhesh Province can overcome the challenges related to the lack of investment in IT infrastructure, human resources, and essential IT sectors. This will lead to the growth of the IT sector, enhanced service delivery, and improved governance in the province.

There is an absence of an **ICT governing body** which can play a crucial role to oversee the **budget allocation and expenditure**, monitor and track the utilization of funds in software applications. The ICT governing body can be provided the authority to ensure that the allocated funds are appropriately utilized for the development and maintenance of software applications.

5.5. SOFTWARE

As per our findings on the available software in Madhesh Province, there are available software applications provided by Federal Government such as Computerize Government Accounting System (CGAS), Budget Management System, Office Automation System, own website. In most of the agencies, they are in use but few of the agencies have still not implemented these applications as per defined standards and procedure. This delay in implementation can be attributed to a list of many factors like lack of skilled human resource, willingness, absence of an IT body to enforce software implementation.

The interaction with the concerned stakeholders has shed light to an existing issue that government agencies in Madhesh Province might face. The issues includes challenges such as software development in a vendor-driven approach, haphazard application development, application duplication and lack of uniformity in applications usage. Some applications provided by federal government and completed the development phase but still have not undergone the implementation phase. Limited technical expertise of employees, compatibility and interoperability issues and lack of willingness for adoption of software, etc. are the possible responsible factors for the delay in implementation of the software.

Besides these, financial constraints, change resistance mentality, lack of software competence and literacy among employees, absence of training and capacity building programs are the challenges that Madhesh Province is facing in terms of software development.

Madhesh Province can improve its software infrastructure by providing adequate funding for software development and maintenance, encouraging the development of local IT talent, prioritizing software infrastructure development. Following key areas of improvement are identified for betterment of e-services in Madhesh Province: **Agriculture, Tourism, Finance, Infrastructural Development, Health, Home Affairs and Communication, Youth and Sports.**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CHAPTER 6 - MASTER-PLAN

This chapter elaborates 10 years E-Governance Master Plan for Madhesh Province which must be achieved as referred in master-plan activities table. The master plan is summarized with annual goals which must be achieved within the targeted milestone. The activities in the table: Master-plan Activities align with the digital initiatives defined by the Digital Nepal Framework 2019, fostering the digital transformation and advancement of Madhesh Province.

Vision: Digitally empowered, transparent and accountable governance.

Mission: To implement a comprehensive e-GMP that harnesses the power of ICT to transform governance processes, enhance transparency, promote citizen participation, and improve e-government development index (EGDI).

Goal: The goal of e-GMP for Madhesh Province is to transform governance processes, promote transparency, enhance public service delivery, empower citizens and make stakeholders accountable through the effective utilization of ICT.

6.1. ENVIRONMENT

Collaboration between Federal, Provincial and Local government

E-governance initiatives require a coordinated effort and seamless integration across different levels of government to ensure consistency, interoperability, and maximum impact. By working together, federal, provincial, and local governments can create an ecosystem that supports the effective implementation of e-governance, enhances citizen engagement, and drives the digital transformation of Madhesh Province.

Digital Nepal Framework 2019 proposes initiatives which Federal Government is currently working on. A collaboration with Federal Government will help Provincial Government in cost cut-down and uniform-standard system.

Need of an ICT governing body

Currently, there is an absence of ICT governing body in Madhesh Province which could oversee all the ICT-related activities leading to a lack of coordination and collaboration among different government agencies responsible for implementing IT-related projects, duplication of efforts, inefficiencies, and delays in project completion. To address this challenger, Madhesh Province can establish an ICT governing body which provides a structured framework for effective

management, oversight, and coordination of ICT-related activities. It ensures strategic alignment, resource optimization, financial transparency, and collaboration, ultimately driving the successful implementation of ICT initiatives and fostering the digital transformation of the province.

An ICT Council could help Madhesh Province in improving its EGDI.

Training and Capacity Building

Capacity Development for e-governance is a pre-requisite for carrying out e-governance in Madhesh Province. Provincial government should focus on building the necessary skills, infrastructures, institutional structures needed for successful implementation of e-governance activities.

A collaboration with Federal government on using a common eLearning platform will also reduce load in creating contents and the uniform contents could be available for the rest of the provinces as well.

Through training and education, infrastructure development, institutional reforms, citizen participation, and monitoring and evaluation, Madhesh Province can build a strong foundation for e-governance implementation and delivery.

This activity follows Digital Nepal Framework's initiatives as mentioned in "Talent and Skills Development" 01.03.17.00 Digital Skills Development Initiatives and 01.03.18.00 Government eLearning Platform.

Public Engagement and E-readiness

Public engagement is crucial for the success of e-governance initiatives as it can help to promote transparency, accountability, participation, service delivery, trust, legitimacy, and policy outcomes. The systems and applications must have provision of easy accessibility by public. A system can only be successful only if there exists a transparency and trust among its stakeholders. Therefore, public should have an easy accessibility of the data and information in the system and applications which will increase the transparency, trust and legitimacy of e-governance process in Madhesh Province.

Public-private partnerships

The involvement and participation of the private sectors in e-government projects is very crucial. The software development and the software training of government agencies is directly or

indirectly dependent on private organizations. Both government agencies and private organizations should go hand in hand so that the nation's manpower can be fully utilized for the up-liftment of ICT sector of Nepal.

This initiative is aligned with Digital Nepal Framework 2019, Entrepreneurship/ Public-Private Partnership (01.02.16.00).

Strong Management Vision, Ethics, and Dedication

Strong management vision, ethics, and dedication towards e-governance in Madhesh Province are crucial for the successful implementation and sustainability of e-governance initiatives. By developing a clear vision, fostering ethical values, ensuring effective leadership, and involving stakeholders, the province can build a culture of e-governance that is transparent, accountable, and effective.

6.2. HUMAN RESOURCES

Streamline recruitment processes

Province government should consider deputing more skilled manpower in various technical positions of government agencies as implementation of e-governance will require more skilled human resources. It is essential for all the government agencies, metropolitans, and municipalities to recruit at least 4 ICT staffs - an IT officer, an IT/Computer engineer and 2 data operators according to the need assessment of each agency.

For any ICT related recruitment, proposed ICT Council (as proposed in 6.1) must participate for best candidate selection.

ICT policies and planning for human resources

The key areas that the Madhesh Province should focus as of now are

- develop ICT policies to set guidelines, regulations, and frameworks formulated to govern the use, implementation, and management of ICT
- prioritize on technical education,
- develop a comprehensive human resource plan,
- provide training and professional development opportunities,
- establish partnerships with educational institutions, streamline recruitment processes,

- assign and IT expert on each government agency and establish an IT body in Province which can monitor the overall ICT sector in Province level and work for the advancement of e-governance in province.

The ICT policies should allow to a set of guidelines, regulations, and frameworks formulated by organizations or governments to govern the use, implementation, and management of information and communication technologies (ICT).

Ongoing Training and Development

Ongoing Training and Development must be conducted by proposed ICT Council and other related agencies to motivate, challenge and enhance skills of the ICT Staffs.

6.3. INFRASTRUCTURE

Adequate Investment in Infrastructures

It is highly recommended that Madhesh Province invests in improving the required infrastructure of government agencies. This could involve helping all agencies to be self-sufficient in terms of infrastructures, assisting them to optimize the available resources and infrastructures, developing a robust internet infrastructure, providing training on internet usage and security, and exploring alternative connectivity options.

Digital Nepal Framework in Technology and Infrastructure section 01.01.12.00 has also clarified need of Provincial Data Center.

Perspective on Autonomous Data Center

Before establishing an autonomous data center, Madhesh Province is required to be self-sufficient in terms of technical capabilities and skilled human resources.

As per current study, Madhesh Province is lacking human resources and technical capabilities and expertise. Putting this into consideration, it is not advisable for Madhesh Province to have its autonomous data center until they form ICT Council and have sufficient and skilled ICT HR.

Madhesh provincial government must establish datacenter once they have a team or council to take charge of it. It is recommended to have a DR site. MPG could also use Federal DR Site at Hetauda to cut down the cost. A detailed requirement analysis on the systems, data volume, and usage must be done prior to start planning on Data Center.

Capacity Building and Training

Madhesh Province can assess the infrastructures need of each government agency to identify areas that require improvement, develop a comprehensive plan, allocate resources, strengthen the existing infrastructures, build new infrastructures, and provide training and support on the effective use of infrastructure and technology.

Enhance internet connectivity

Madhesh Province can improve internet connectivity in Madhesh Province by expanding broadband coverage, enhancing network infrastructure, and reducing connectivity gaps. This includes extending internet access to remote areas, improving network speeds, and ensuring reliable connectivity for government offices and public service centers.

Public-private partnerships

Madhesh Province can collaborate with private sector organizations to leverage their expertise and resources in infrastructure development, engage in public-private partnerships to enhance connectivity, establish data centers, and improve network infrastructure. Private sector involvement can bring in additional investment, technological expertise, and innovation.

Collaborating with private organizations, Madhesh Province can effectively fulfill the infrastructure needs of government agencies and strengthen their existing infrastructure, enabling them to implement e-governance activities effectively. Catering the need for infrastructures and strengthening the infrastructures can lead Madhesh Province to effectively leverage e-governance activities leading to efficient and effective public service delivery.

6.4. INVESTMENT

Without sufficient budget allocation, it becomes challenging to implement IT-related projects effectively, efficiently, and in a timely manner. This leads to delays in project completion, lower quality outputs, and a significant lag in the IT domain in the province. Moreover, the lack of investment in human resources and essential IT sectors like hardware, software, and network infrastructure creates a shortage of qualified staff and impedes the growth of the IT sector.

Budget allocation

To address this challenge, we recommend that Madhesh Province increases its budget allocation for the IT sector keeping in mind that the advancement of IT sector in province plays a significant role in the overall provincial development.

The budget allocation should prioritize in the areas of **IT infrastructure, Human Resources, Capacity Building, Research and Development, Public-Private Partnerships**.

By increasing the budget allocation for the IT sector, Madhesh Province can overcome the challenges related to the lack of investment in IT infrastructure, human resources, and essential IT sectors. This will lead to the growth of the IT sector, enhanced service delivery, and improved governance in the province.

Role of an IT governing body in Budget and Planning

An IT governing body can play a crucial role to oversee the budget allocation and expenditure, monitor and track the utilization of funds in software applications. Furthermore, establishing clear guidelines and monitoring mechanisms can enhance transparency and accountability, ensuring that funds are utilized effectively for the development and advancement of software applications in the province.

Develop an IT investment strategy

Formulate a comprehensive IT investment strategy that outlines the goals, priorities, and key areas for investment. The strategy should align with the province's overall development objectives and consider the unique needs and opportunities of the IT sector.

Foster public-private partnerships

The collaboration between the government and private sector entities in IT investments engaging them with technology companies, IT service providers, and industry experts to form partnerships can leverage their expertise, resources, and technologies. Public-private partnerships can help bridge funding gaps and accelerate IT investments.

6.5. SOFTWARE

The interaction with the concerned stakeholder has resulted a common voice that the trend of haphazard application development needs to be ended and that the province government and all the levels under it should focus on using the pre-existing software applications provided by federal government which will create a uniformity, ease of use and consistency in the province government. This will also bring an end to unnecessary application duplication issues, absence of uniformity in applications usage and will enhance the public service delivery mechanism.

Apart from the pre-existing software applications, through our finding we came to know that Madhesh Province still lacks areas of improvement and requires a solid strengthening and enhancement in e-services in a lot of areas which have been explained below:

Following are the domains which are identified to be necessary for improvement for the betterment of E-Services in Madhesh Province.

Table 12 – Identified Areas of Improvement for Madhesh Province

AGRICULTURE	Primarily an agrarian economy, Nepal's agriculture sector accounted for ~33% of the nation's GDP and ~76% of total employment in 2016. Agriculture is one of the most important factors that helps in economy of the Madhesh Province. Proper management of Agricultural system is seen necessary to strengthen the agricultural sector. Following are the requirements for the system in agriculture: ▪ System to keep the track of crop yields, input costs, and other key metrics which can help the farmers to manage their farm. Similarly, features that can map soil types and plan field layouts are used to create maps and analyze data related to agriculture. ▪ Accurate weather tracking is essential for effective agriculture management. ▪ Features that helps farmers manage their livestock, including tracking herd health, breeding, and feeding schedules also helps farmer to manage their livestock. ▪ Features that tracks the records of subsidy given to the farmers are also necessary so that each and every deserving farmer can get subsidy in equal and controlled manner (only one subsidy via Federation or Province). ▪ Disease prevention and information system for animals are also seen necessary to prevent and control animal epidemic outbreak, ▪ An Irrigation Tracking System for MPG would bring benefits, such as efficient water management, improved agricultural productivity, and effective monitoring of irrigation infrastructure.
TOURISM	Some suggested requirements that can be used in the tourism sector by Madhesh Province ▪ Software that is used to manage tourism destinations, including visitor information, bookings, and local services ▪ Similarly, tourism promotions can also be done in digital medium through the system. ▪ Many governments now offer mobile tourism apps that provide visitors with information about local attractions, events, and services. These apps can be used to improve the visitor experience and encourage repeat visits. ▪ Software can also be used to create immersive tourism experiences, allowing visitors to explore destinations in a virtual environment. Analytics software can be used to track and analyze tourism data, including visitor numbers, spending patterns, and visitor behavior. This information can be used to inform tourism policy and marketing strategies.

FINANCE	Some suggested requirements to use in the finance sector by Madhesh Province: ▪ Madhesh Province can use the system to manage financial transactions and budgets. With this, they can manage their own finances, including taxes, grants, and loans. ▪ Systems can be used to identify and manage potential risks to financial institutions and to the broader financial system. Madhesh Province can use risk management software to monitor financial markets and to regulate financial institutions.
INFRASTRUCTURE	Many different software tools can be used in the infrastructure development sector by the government, depending on the project's specific needs. ▪ 3D modeling software can be used that allows architects, engineers, and construction professionals to design and simulate building structures, systems, and processes. This can help improve the efficiency and accuracy of the design and construction process, reduce costs, and improve safety. ▪ The software tool that allows users to create, store, analyze, and share geographic data should be used. This can be used in infrastructure development to map out land use patterns, transportation routes, utility lines, and other key data. ▪ Project management software can be used to streamline and organize the various tasks involved in infrastructure development, from initial planning to construction and maintenance. ▪ Asset management software can help track and maintain infrastructure assets over time, including roads, bridges, and water systems.
YOUTH AND SPORTS	It is crucial to invest in youth and sports domain for the long-term growth and prosperity of province. By providing opportunities for youth to develop their skills and talents, Madhesh Province can build a strong and vibrant workforce for the future. Following are the recommendations on how can Madhesh province enhance the youth and sports of its province. ▪ Skill Bank is a portal where all the job seekers create their profiles, updates their skills and the professional skills of all the skilled individuals who are seeking acquisition accumulate in the skill bank which is then recognized by the agencies to fulfill their requirements. A system designed to manage and organize information related to youth and sports programs, events, and activities. It is used to track and manage information about participants, facilities, coaches, and schedules. The system can automate administrative tasks such as registration and scheduling and the reports in the system can be used to evaluate program effectiveness and identify areas of improvement.

EDUCATION	The government can use systems in the education sector to improve the delivery of education with features such as manage student data, including enrollment, attendance, grades, and transcripts etc.The system that includes modules for course content management, student registration, grading and assessment, communication, and reporting can be used. This allows instructors to create and publish course content, including multimedia resources such as videos, audio files, and interactive simulations. It also enables instructors to track student progress, provide feedback, and assess student learning outcomes.
HOME AFFAIRS	Home ministry is one of the crucial bodies of Provincial government. To assist them in their task, various software solutions can be used. These are some suggestions received to carry out the functions of home ministry smoothly: ▪ The system helps the government to manage emergency situations, such as natural disasters are seen to be most important. It can track emergency responses, manage resources, and communicate with emergency responders. ▪ A video surveillance system is also seen as one of the important software to monitor public areas and detect potential security threats. ▪ System that are directly benefited to costumers are needed. G2C system are needed to be developed.
HEALTH	These are various software that can be used in the health sector by the government, including: ▪ Digital versions of patient health records provide real-time access to patient information for healthcare providers should be used. They can improve patient care, reduce medical errors, and increase efficiency. ▪ Tools to track, monitor, and respond to disease outbreaks and other public health threats. These systems collect, analyze, and disseminate health-related data to inform public health policy, interventions, and response efforts. ▪ System to manage the registration and renewal of healthcare facilities such as hospitals, clinics, and diagnostic centers is necessary. This system is designed to streamline the registration and renewal process and ensure that healthcare facilities meet regulatory and quality standards. Software that keeps records of Insurance and patient treated under insurance policy and the medicines distributed under insurance policy should also be used so that actual data of the insured patients and services taken by them can be obtained.

Madhesh Province can improve its software infrastructure by providing adequate funding for software development and maintenance, encouraging the development of local IT talent, prioritizing software infrastructure development. Following key areas of improvement are identified for betterment of e-services in Madhesh Province: **Agriculture, Tourism, Finance, Infrastructural Development, Health, Home Affairs and Communication, Youth and Sports.**

6.6. MASTER-PLAN/ ACTIVITY GOALS

Following are the recommended annual activity goals to be achieved by Madhesh Provincial Government. The status represents as shown below

P Activities Madhesh Province Government (MPG) can independently act upon.

F Activities MPG should collaborate with related Federation Body.

U Up-gradation, enhancement, patches or integration of systems

T Training, Implementation and Awareness

A Annual Maintenance Service

NOTE: Given the evolving nature of ICT and the dynamic requirements for an E-GMP, an additional list of activities has been included in the Annexure. These activities can be incorporated into the annual goals of any given year as per the specific needs identified by the Madhesh Province Government (MPG).

Table 13 – Master-plan Activities

SN	Proposed Activities	10 years plan									
		01	02	03	04	05	06	07	08	09	10
1.	Formation/ Operation of Madhesh Province ICT Council	P									
2.	ICT HR Recruitment	P	P								
3.	Implementation of existing systems in Agencies/LGs of Madhesh	P	P	P	P	A	A	A	A	A	A
4.	Centralized website system for Agencies of Madhesh Province	P	A	U	A	U	A	U	A	U	A
5.	CM Dashboard	P	U	U	U	U	U	U	U	U	U
6.	Integrated Municipality System	P	U	U	U	U	A	A	A	A	A
7.	Digital literacy to public	P	P	P	P	P	P	P	P	P	P
8.	Agriculture and Livestock Information Management System		P	P	A	A	A	A	A	A	A
9.	Capacity Building and Training Programs for officials	P	P	P	P	P	P	P	P	P	P
10.	Electronic Health Records (EHR) System			P	U	A	U	A	U	A	A
11.	Development of Integrated Tourism MIS		P	U	A	U	A	U	A	A	A

12.	Integrated Transport System	P	U	A	A	U	A	U	A	A	A
13.	Development of Integrated Industry MIS		P	U	A	U	A	U	A	A	A
14.	Development of Integrated Forest MIS			P	U	A	U	A	A	A	A
15.	e-Learning Management System	F	F	P	U	A	U	A	A	A	A
16.	Skill Bank: Talent Acquisition Management System			P	U	A	A	A	A	A	A
17.	Integrated Youth and Sports MIS				P	U	A	A	A	A	A
18.	Evaluation of E-GMP semi-annual development and growth	P	P	P	P	P	P	P	P	P	P

6.6.1 FORMATION OF MADHESH PROVINCE ICT COUNCIL

Madhesh province shall form an ICT Council under OCMCM. The proposed ICT Council may follow following high-level office bearers under the leadership of Honorable Chief Minister. The members shall be nominated by Madhesh Province Government.

Table 14 – High-level Office Bearers for ICT Council

SN	High Level Office Bearers	Position
1.	Chief Minister	Chairperson
2.	Minister, Ministry of Home Affairs, Communications and Law	Vice Chair
3.	Principal Secretary	Member
4.	Provincial Policy and Planning Commission Member (ICT relevant if any)	Member
5.	Secretary, OCMCM	Member
6.	Secretary, Ministry of Home Affairs, Communications and Law	Member
7.	Secretary, Ministry of Finance	Member
8.	ICT Expert	Member
9.	ICT Expert (Female)	Member
10.	Executive Director of Council	Member Secretary

There may be an Executive board formed to help Executive Director in planning executive roles and responsibilities according to the jurisdiction and goals set to the ICT Council.

Table 15 – Executive Board for ICT Council

SN	Executive Board	Position
1.	Executive Director of Council	Chairperson
2.	Under Secretary (Administration), OCMCM	Vice Chair
3.	Under Secretary (ICT), OCMCM	Member
4.	Under Secretary, Ministry of Home Affairs, Communications and Law	Member
5.	Under Secretary, Ministry of Finance	Member
6.	Head of Administration of Council	Member Secretary

The ICT Council shall be provided with 4 ICT/computer engineers/officers, 1 cyber security engineer and 8 computer operators for operation, monitoring, implementation of ICT goals of council. The computer operators shall provide dedicated support to the e-service applications proposed in the E-GMP.

The council must be envisioned to work as advisory and liaison agency for Madhesh province government with following (but not limited to) activities.

1. Formulation and Implementation of Madhesh Province ICT Guidelines, Standards, Policies in relation to
    a. Data Privacy, Data Exchange.
    b. GEA
    c. ICT Security
    d. System Development
    e. ICT Budgeting
2. Facilitate/ Monitor Software Development and Implementation
3. Information System Audit and VAPT for different agencies at Madhesh province
4. ICT Staffs Recruitment and ICT Capacity Building
5. Support, Implementation and Operation of Data Center and ICT Infrastructures at province level.
6. Any ICT related activities in Madhesh Province.

Stakeholders	▪ OCMCM ▪ PPPC ▪ MoHAC ▪ MoF
Timelines	▪ **Immediate**
Outcome	▪ Proper implementation of ICT Guidelines, Standards and polices ▪ Qualitative Software/ ICT Projects development and implementation ▪ Ensuring efficient ICT human resources recruitment ▪ Ongoing capacity development ▪ Planning and Budgeting on ICT related activities. ▪ Coordination between agencies in Madhesh Province.

6.6.2 ICT HR RECRUITMENT

Development of a comprehensive human resource plan assessing the workforce requirements, talent sourcing and outreach, streamlining the recruitment processes, capacity building and

training of IT personnel are the key strategies which shall be followed by Madhesh Province for ensuring efficient ICT human resources recruitment. It is of utmost importance to hire and select individuals for information and communication technology (ICT) positions in Madhesh Province.

It is recommended to recruit 1 Sr. Computer Engineer (Under-Secretary) for OCMCM, 4 ICT/computer engineers/officers, 1 cyber security engineer and 8 computer operators for ICT Council. Furthermore, every agencies at Ministry level must have at least 1 computer engineer or ICT Officer.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Province Public Service Commission
Timelines	▪ **Immediate**
Action plan	▪ MPG should start hiring ICT resources
Outcome	▪ Result in hiring of skilled professionals in the field of ICT ▪ Address the shortage of ICT professionals in Madhesh Province ▪ Foster innovation and digital transformation within the province ▪ Diverse skill sets and expertise in areas of Information and Technology

6.6.3 IMPLEMENTATION OF EXISTING SYSTEMS

The **CGAS system** refers to the Computerized Government Accounting System. It is a digital accounting system implemented by the Government of Nepal to streamline and modernize financial management practices in various government offices and agencies. The CGAS system aims to enhance transparency, efficiency, and accountability in the financial operations of the government. Under the CGAS system, traditional manual accounting processes are replaced with computerized systems that automate various financial functions. It includes modules for budget preparation, fund management, expenditure tracking, revenue collection, payroll management, and financial reporting.

Action plan: All agencies under Madhesh province are already found to be using it. MPG must assure, those agencies follow proper guidelines and are using the system as per the defined uniform standards.

Attendance System involves a digital solution to track and manage attendance records of employees within the department or organization.

Action plan: MPG can implement already developed attendance application by DOIT with less investment on time and money. This might incur some additional cost on hardware. The need of number of hardware can be identified by ICT council and stakeholders.

The **Office Automation System** shall be designed to streamline and automate administrative processes within government offices. It can include features such as document management, workflow automation, task assignment and tracking, communication tools, and data analytics. The Office Automation System can simplify and accelerates routine tasks, such as document creation, approval processes, and data entry, reducing paperwork and manual effort.

Action plan: MPG can implement already developed Office Automation System by DOIT (recommended) or OCMCM Madhesh with less investment on time and money.

Personnel Information System (PIS) is a digital system that facilitates the management of human resources within an organization. It automates various personnel-related tasks, such as employee records management, recruitment, performance evaluation, training and development, payroll, and benefits administration. Employee Records Management, Performance management, Training and development etc. are the key components of PMIS.

Action plan: MPG can implement Personal Information System developed by OCMCM or use system developed by Federal Government to cut down investment.

Provincial Assets Management System (PAMS) is an application developed by Federal Government that provides strategic step towards efficient management and tracking of assets at provincial government offices. This system provides a centralized platform for recording, tracking, and analyzing information related to assets such as land, buildings, infrastructure, vehicles, equipment, and other tangible and intangible resources. The implementation of PAMS in Madhesh Province must be done with proper guideline and standards and in all agencies.

Action plan: MPG can replicate Federal system named Public Assets Management System.

Integrated Financial Management Information System helps governments and other public sector organizations to manage their financial information, including budgeting, accounting, and reporting. It will provide better oversight transactions and enable the tracking of financial data in real time. It will allow for the integration of data from various governments and agencies, enabling a more coordinated approach to financial management.

Action plan: Some of the systems such as Sutra, PLMBIS has been found to be in use in some of the agencies, however, other agencies might be in need of guidance and motivation for its use. User-level trainings might help in proper implementation.

NWaSH: This system integrates various modules and functionalities to monitor, analyze, and manage water supply, population coverage, household coverage, municipality coverage, distribution, and consumption.

Action plan: This system should be replicated in Madhesh province.

Land Record System: Land Records Management Information System is a federal system designed to facilitate the efficient management, retrieval, and analysis of land-related data. The Land Record Management Information System (MIS) can be a vital tool for Madhesh province for efficient management and maintenance of land records within the province which encompasses various modules, including land registration, and record maintenance.

Action plan: Assessment on system use must be done and necessary training must be provided to ensure proper use of system.

PLMBIS-LMBIS Integration: LMBIS is an online programme submission system in the budget which has created direct link between line ministries program budget formulation and implementation with cooperation and coordination with Ministry of Finance and the National Planning commission. This system is interlinked and interfaced with the Budget Management Information System (BMIS) of the Federal MoF. Similarly, PLMBIS is a system being used by Province Level Government. Integration between Federal-Provincial systems is must to avoid duplication in the budget plan and reporting.

Action plan: MPG must assure, those agencies follow proper guidelines and are using the system as per the defined uniform standards by providing necessary training and guidelines.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Line Agencies
Timelines	▪ **Immediate**
Action Plan	▪ Pre-built relevant applications must be implemented ▪ The implemented applications statistics and information must be integrated to CM Dashboard as needed.

Outcome	▪ It can provide efficiency, accurate data, improved management, increased accountability and contribute to improved governance and organizational performance. ▪ It can enhance productivity, reduce administrative delays, improve data accuracy, and enhance overall office efficiency.

6.6.4 CENTRALIZED WEBSITE SYSTEM

A centralized website system for agencies of a province will involve creating a unified online platform where various agencies of Madhesh Province will have their own dedicated sections or subdomains to share information, provide services, and interact with the public. This centralized system will offer several benefits, including streamlined access to government services, improved information sharing, and enhanced citizen engagement.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ All concerned ministries and agencies
Timelines	▪ **Long-term**
Action Plan	▪ MPG should build Centralized Website System following website development guidelines and GEA ▪ It should be sharing data such as News, Events, Notices, announcement etc to CM Dashboard's public facing site
Outcome	▪ Ensure streamlined access to government services, improved information sharing, and enhanced citizen engagement. ▪ Streamlined and efficient information dissemination ▪ Data integration and analysis will lead to better insights and informed decision-making

6.6.5 CM DASHBOARD

CM Dashboard can be a web application which is supposed to include reference of all applications. It should have statistics and updates on grievance system, automation system, attendance, and any other system developed for MPG. As soon as any system is developed for MPG, an API must be developed and integrated with CM Dashboard. This should help OCMCM to remain updated about the exact situation in Madhesh province.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Other line-agencies

Timelines	▪ **Long-term**
Action Plan	▪ CM Dashboard development and integration with other applications
Outcome	▪ Provides real-time updates and statistics allowing the Chief Minister and relevant authorities to make informed decisions ▪ Promote transparency and ensure accountability for the delivery of services ▪ Ensure streamlined grievance management allowing CM to address citizen complaints efficiently ▪ Improved coordination and collaboration ▪ The CM dashboard's insights and statistics will help the Chief Minister in future planning and policy formulation, identifying areas of improvement, setting goals, and aligning strategies to achieve desired outcomes in Madhesh Province.

6.6.6 INTEGRATED MUNICIPALITY SYSTEM

The Integrated Municipality System (MIS) for local government is a comprehensive software system to be designed to facilitate the efficient management of municipalities in Madhesh province. It encompasses various modules to streamline administrative processes, enhance service delivery, and improve governance at the local level.

Online Sifaris System: One of the modules included in the Integrated Municipality MIS is the "सिफारिस" (Sifaris) module. This module focuses on managing official requests, applications, and approvals within the municipality. It enables citizens to submit various types of requests or applications online, such as relationship certificate, citizenship/ NID recommendations, Chaar-Killa Sifaris, electricity/ water connection recommendations and all other municipal services. The module tracks the progress of each request, automates the workflow for approvals, and provides an integrated platform for communication between citizens and municipal officials.

Grievance Management: Another module within the Integrated Municipality MIS is the "**Grievance**" module. This module is designed to address public grievances and complaints effectively. It provides a platform for citizens to lodge grievances related to municipal services, infrastructure, or any other administrative matters. The module tracks the grievances, assigns them to the relevant authorities, and ensures timely resolution and follow-up. It helps in monitoring the performance of grievance redressal mechanisms and improving the overall satisfaction of citizens.

LG Judiciary System: This module shall help LG in registering disputes under its jurisdiction, assign mediator, hearing, and provide necessary judgment.

LG Project Management: This module shall help LGs in monitoring and evaluating a transparent plan on its local development. Citizens could also request/submit development projects which when shortlisted could go on project plan. Citizens could review progress on projects, provide feedback, control quality and report corruption, upcoming plan etc.

LGs task management: Most of the leaders have numerous daily activities and they operate with a word-of-mouth. They expect that delegating a task by oral command might give result expected. However, it is very difficult to tract assigned tasks. Thus, this application can help assigned tasks, progress, and status of tasks assigned by leaders or higher level officers allowing to speed up task or identifying tasks which does not show progress relatively.

Digital Social Database: Digital Database System can be an advanced web based and mobile application system designed and developed for collecting and managing the information based on identified indicators on different thematic areas of social development and SDGs viz. education, health, culture and arts, drinking water and sanitation, youth and sports.

It shall be more of a centralized electronic repository or system that stores and manages social data or information related to individuals, communities, or populations. It shall be designed to collect, organize, analyze, and utilize social data for various purposes, such as social planning, policy-making, research, and program implementation. The database shall be able encompass a wide range of information, including demographic data, socioeconomic indicators, health records, education records, employment data, and more.

The Digital Social Database system can have modules such as Survey Management Module, from where a survey toolkit can be used to assess the social and sustainable development indicators, a configuration module whereby all the social data indicators, and sustainable development goals indicators questionnaires, districts, municipalities and wards of Madhesh Province can be configured.

Integrated School: Integrated School Management Information System with Mobile Application can help to manage and automate various aspects of schools, including student and staff information, academic planning and scheduling, attendance tracking, grades management, and communication with parents and guardians. The mobile application provides access to key features of the system from mobile devices, allowing parents, and staff to access important information and perform tasks on-the-go. It can help schools manage their operations more efficiently, enhance the student experience, improve data accuracy, increase parental involvement, comply with regulations, and facilitate communication among all stakeholders. This integrated system should be delivered on websites and mobile-based devices enabling:

- Students to attend pre-loaded video classes on specific subjects, check homework, submit assignments, and self-design learning programs according to their pace or preference.
- Teachers to upload assignments, check homework, provide additional help to weak students through video chat, and publish exam schedules.
- Integration of a cloud-based library where content can be downloaded onto laptops/mobiles to access in areas with no Internet connectivity.

Building Permit System: It can be developed to assist municipalities to improve their current building permit process. It shall ensure the effective compliance of the NBC (National Building Code) and BBL (Building by Law) in urban regions, thus promoting safe building practices and planned urban development for the entire nation. This web-based application through which building permit applications are processed and current building records shall be maintained.

Tax System: One of the core income source of LG is annual property and business ownership tax. An integrated Tax System could help LGs in using a standard system across the province. It could help payers review taxes paid, outstanding taxes, fines etc.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Local Government
Timelines	▪ **Immediate**
Action Plan	▪ MPG shall get this system developed and should provide independent admin-user-access in multi-site environment to the LG to cut-down repeated development of same system across different LG. ▪ The statistics must be integrated to CM Dashboard
Outcome	▪ It can provide efficiency, accurate data, transparency, improved management, increased accountability and contribute to improved governance and organizational performance. ▪ It could cut down repetitive development cost. ▪ It could also cut down VM's request to GIDC and thus free down infrastructure resources. ▪ It could also be more manageable in updating systems, patching up, backup etc.

6.6.7 DIGITAL LITERACY TO THE PUBLIC

Madesh Province can consider PPPs with local and international NGOs to provide digital literacy training to digitally uninitiated sections of society in Madhesh. The government should

encourage NGOs to leverage training centers, computer labs, and citizen cyber cafes in government departments and educational institutions to provide digital literacy courses for a nominal fee/free.

Digital literacy will enable citizens to access information, communicate, and engage in e-governance activities, thereby increasing their participation in decision-making processes.

Awareness Campaigns, Training programs, workshops, and webinars, etc. can be done to literate the public. This will equip individuals with the skills and knowledge to effectively navigate and utilize digital technologies, such as computers, smartphones, and the internet. The training should also be conducted for other relevant activities proposed in master-plan. Such programs could be conducted via LGs.

Stakeholders	▪ OCMCM ▪ Ministry of Education and Social Welfare ▪ Local Governments ▪ General Public
Timelines	▪ **Long-Term**
Action Plan	▪ Ongoing Training and awareness campaigns must be exercised ▪ The campaign status must be integrated to CM Dashboard as well
Outcome	▪ Enhances employability as many job opportunities require basic digital skills. ▪ Madhesh Province can bridge the digital divide, empower individuals, and create a more digitally inclusive society where citizens can fully harness the benefits of the digital world. ▪ Fosters economic growth and promote inclusivity

6.6.8 AGRICULTURE AND LIVESTOCK SYSTEM

Agriculture and Livestock monitoring and management can be accomplished through the use of IOT sensors, drones, cameras, and image recognition software. The sensors will be connected to a central control room, which collates all the data and notifies in case of any change in climate, environmental conditions or animal behavior.

Digital record keeping and sharing of quality-related information and competitive prices of seeds, breeds, fertilizers and saplings with feedback options on quality will help farmers to choose appropriate raw materials resulting in better quality production of agricultural and livestock products.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Agriculture Knowledge Center
Timelines	▪ **Medium-Term**
Action Plan	▪ A system must be implemented and linked with CM Dashboard
Outcome	▪ Enhance the use of enabling technology, in particular ICT to strengthen the agriculture sector ▪ Improve animal health and productivity ▪ Improve agricultural productivity due to better access agriculture tools and technologies ▪ Promote sustainable agriculture and fosters economic growth

6.6.9 CAPACITY BUILDING AND TRAINING PROGRAMS

Capacity building and training programs **for officials** in Madhesh Province will play a crucial role in enhancing their skills, knowledge, and capabilities to effectively perform their roles and responsibilities. These programs will aim to provide targeted training and development opportunities to government officials across various departments and levels of administration.

These programs must include **workshops, seminars, on-the-job training**, mentoring, and specialized courses focused on areas such as public administration, project management, leadership, financial management, and information technology. By nurturing the talents and capabilities of its officials, Madhesh Province can improve e-governance, promote innovation, and enhance public service delivery for the benefit of its citizens.

By investing in capacity building, Madhesh Province can ensure that its Civil Service Officials are equipped with the necessary competencies to navigate the complexities of governance, policy implementation, and service delivery.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ PRTC ▪ Line Ministries and Local Governments
Timelines	▪ **Long-Term**
Action Plan	▪ Conduct ongoing training as per the need to all Civil Servants of Madhesh
Outcome	▪ Equip officials with necessary competencies needed to navigate the

	complexities of governance, policy implementation and service delivery. ▪ Nurture talents and capabilities of officials ▪ Improve e-governance, promote innovation and enhance public service delivery

6.6.10 ELECTRONIC HEALTH RECORDS (EHR) SYSTEM

Electronic Health Records (EHR) System will be designed to replace traditional paper-based medical records, and provide healthcare professionals with access to accurate, up-to-date patient information in a secure electronic format.

EHR system aims to be a miniature warehouse of medical records where the prescriptions, test records, medical history, physical and psychological examinations, medical prescriptions, diagnosis and prognosis, result of treatment and procedure implemented, allergies and risk factors, disabilities and many more are accumulated in one folder without letting patients carry away house details.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Health and Population
Timelines	▪ **Medium-Term**
Action Plan	▪ Develop and Implement EHR ▪ Maintain an API to link with CM Dashboard and Federal systems if any.
Outcome	▪ Providing accurate, up-to-date and complete information about patients at the point of care. ▪ Helps healthcare providers to improve patient care, increase efficiency, and enhance security and privacy of patient data. ▪ Enabling quick access to patient records for more coordinated, efficient care

6.6.11 DEVELOPMENT OF INTEGRATED TOURISM MIS

The Integrated Tourism Management Information System (MIS) will be a comprehensive software solution designed to enhance the management and promotion of tourism in Madhesh Province. This system will integrate various modules and functionalities to streamline tourism-related activities, including tourist information management, destination marketing, bookings and reservations, tourism product development, and visitor feedback and reviews.

The MIS may deploy AR/VR technology on the website to showcase popular attractions of Madhesh Province (e.g., Janaki Temple, Ganga Sagar, Dhanush Sagar, Ram Mandir, other temples) and immersive content, giving travelers a real-world feel. The website can also contain pre-loaded historical information on key tourist sites, temples and museums; and offer travelers the option to explore and gain knowledge about various culturally valued places.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Industry, Tourism and Forest ▪ Local Government ▪ Nepal Tourism Board (Federal)
Timelines	▪ **Medium-Term**
Action Plan	▪ Develop and Implement the system ▪ Maintain an API to link with other systems
Outcome	▪ Provides a centralized platform for collecting, analyzing, and disseminating tourism data, enabling effective decision-making, strategic planning, and resource allocation. ▪ Enhance the management and promotion of tourism in Madhesh Province increasing economic growth

6.6.12 INTEGRATED TRANSPORT SYSTEM

A transportation management system (TMS) software designed specifically for the Madhesh Province will address the unique transportation challenges and requirements of the province.

The TMS software can have several modules and features such as Transport Registration, Renewal, Vehicle Tracking and Monitoring, Transport Regulation and Compliance, Reporting and Analysis and overall transportation management which will be designed to tailor the needs of the Madhesh Province.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Labor and Transport ▪ Transport Management Office
Timelines	▪ **Medium-Term**
Action Plan	▪ Assessment on system use must be done and necessary training must be provided to ensure proper use of system

Outcome	▪ Address the unique transportation challenges and needs of Madhesh Province. ▪ Help to optimize the transportation operations, improve efficiency and enhance overall transportation service.

6.6.13 DEVELOPMENT OF INTEGRATED INDUSTRY MIS

The Integrated Industry Management Information System (MIS) can be designed to integrate various modules and functionalities such as Industry Registration, Industry Renewal, Address change, partner's alteration, name change, capital change, MoA/AoA updates, Documents Management and Archival, Human Resource Management, Training Management, Payment Records and Integrated Payment System etc.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Industry, Commerce and Tourism
Timelines	▪ **Medium-term**
Action Plan	▪ Develop and Implement the system ▪ Maintain an API to link with other systems
Outcome	▪ It can provide records on industry, capital, investments etc

6.6.14 DEVELOPMENT OF INTEGRATED FOREST MIS

The Integrated Forest Management Information System (MIS) can facilitate efficient and sustainable management of forests in Madhesh Province. This system can integrate various modules and functionalities to streamline forest-related activities, including forest inventory, resource planning, monitoring, and conservation. The Integrated Forest MIS can provide a centralized platform for collecting, analyzing, and disseminating forest data, enabling informed decision-making, strategic planning, and effective resource allocation. It can assists forest authorities in managing forest resources, monitoring deforestation, implementing conservation measures, and enforcing regulations. The system can also support the tracking of forest revenue, timber harvesting, and forest-based industries.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Forest and Environment
Timelines	▪ **Medium-term**

Action Plan	▪ Develop and Implement the system ▪ Maintain an API to link with other systems
Outcome	▪ It can help in maintain efficient forest inventory, monitoring and planning.

6.6.15 E-LEARNING MANAGEMENT SYSTEM

An e-Learning Management System can facilitate the delivery, management, and tracking of online learning and training programs. It can provide a virtual environment where instructors can create and organize educational materials, interact with students, administer assessments, and monitor their progress. Course creation and organization, Communication and Collaboration, Assessment and Grading, Process tracking and Reporting, etc. can be the major features of this system but not limited to it.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Education and Social Development ▪ Provincial Research and Training Center
Timelines	▪ **Medium-term**
Action Plan	▪ Develop and Implement the system ▪ Maintain an API to link with other systems
Outcome	▪ It can help in capacity building, skill development.

6.6.16 SKILL BANK: TALENT ACQUISITION MS

Skill Bank is a proposed portal where all the job seekers can create their profiles, update their skills and the professional skills of all the skilled individuals who are seeking acquisition accumulate in the skill bank which is then recognized by the agencies to fulfill their requirements. By leveraging the skill bank, agencies can easily search for and identify qualified candidates based on their desired skill sets.

Stakeholders	▪ OCMCM ▪ ICT Council ▪ Ministry of Labor and Transport ▪ Provincial Research and Training Center
Timelines	▪ **Medium-term**

Action Plan	▪ Develop and Implement the system or coordinate with Koshi Provincial Government to replicate or use their system ▪ Maintain an API to link with other systems
Outcome	▪ Skill Bank can play a vital role in bridging the gap between skilled individuals and job opportunities, promoting a more dynamic and productive labor market.

6.6.17 INTEGRATED YOUTH AND SPORTS MIS

Integrated Youth and Sports MIS can be designed to manage and organize information related to youth and sports programs, events, and activities. It can be used to track and manage information about participants, facilities, coaches, and schedules. The system can automate administrative tasks such as registration and scheduling and the reports in the system can be used to evaluate program effectiveness and identify areas of improvement. This integrated MIS may contain modules like event and campaigns creation, volunteer programs and registration, team and roster management, training and development, performance tracking and analysis, reporting and analytics.

Stakeholders	▪ OCMCM ▪ ICT Council
Timelines	▪ **Medium-term**
Action Plan	▪ Develop and Implement the system ▪ Maintain an API to link with other systems such as federal system if any and CM's Dashboard
Outcome	▪ This system shall help Madhesh Government maintain a database on its Youth and Sports activities.

6.6.18 SEMI-ANNUAL EVALUATION OF E-GMP

Evaluating semi-annually, the development and implementation of the e-Governance Master Plan (e-GMP) activities twice each fiscal year over a tenure of 10 years shall provide valuable insights into its progress and effectiveness. The evaluation must involve assessing various activities, progress and status to measure the plan's impact on governance, digital transformation, and citizen services. Each evaluation focuses on key aspects such as: Infrastructure Development, Service Delivery, Digital Inclusion, Governance Transformation, User Feedback, Training and Capacity Building.

Stakeholders	▪ OCMCM Madhesh ▪ ICT Council
Timelines	▪ **Long-term**
Action Plan	▪ Check current progress and perform gap analysis ▪ Plan for next year accordingly
Outcome	▪ By conducting annual evaluations, trends and patterns can be identified, allowing for continuous improvement and refinement of the e-GMP. The evaluations serve as a basis for strategic adjustments, resource allocation, and decision-making to ensure sustained development and growth in e-governance over the tenure of 10 years.

6.7 ACTIVITY MONITORING

Table 16 – Master-plan Activities

SN	Activities			Monitoring											
		Baseline	Target	01	02	03	04	05	06	07	08	09	10	Achievement	Remarks
1.	Formation/ Operation of Madhesh Province ICT Council	0	1	1											
2.	ICT HR Recruitment	0	14	14											
3.	बImplementation of existing systems in Agencies/LGs of Madhesh	0	9	3	2	2	2								
4.	Centralized website system for Agencies of Madhesh Province	0	1	1											
5.	CM Dashboard	0	1	1											
6.	Integrated Municipality System	0	9	9											
7.	Digital literacy to public	0	10	1	1	1	1	1	1	1	1	1	1		
8.	Agriculture and Livestock Information Management System	0	1		1										

9.	Capacity Building and Training Programs for officials	0	20	2	2	2	2	2	2	2	2	2	2		
10.	Electronic Health Records (EHR) System	0	1			1									
11.	Development of Integrated Tourism MIS	0	1		1										
12.	Integrated Transport System	0	1	1											
13.	Development of Integrated Industry MIS	0	1		1										
14.	Development of Integrated Forest MIS	0	1			1									
15.	e-Learning Management System	0	1			1									
16.	Skill Bank: Talent Acquisition Management System	0	1			1									
17.	Integrated Youth and Sports MIS	0	1				1								
18.	Evaluation of E-GMP semi-annual development and growth	0	20	2	2	2	2	2	2	2	2	2	2		

7. CONCULSION AND RECOMMENDATIONS

7.1 CONCLUSION

The successful implementation of the Master-plan requires close collaboration and consultation with stakeholders, including government officials, businesses, and citizens. Emphasis should be placed on creating awareness among all concerned stakeholders about the long-term benefits of the E-Government Master-plan.

To ensure smooth execution, it is crucial to address the financial aspect by allocating adequate budgets for the implementation of the E-Government projects within the fiscal policies and budgets. Additionally, conducting awareness programs for all stakeholders, including government officials and users, will foster a deeper understanding and support for the projects identified in the Master-plan.

The E-Governance Master-plan for Madhesh Province envisions a transformed governance landscape, leveraging technology to provide efficient, transparent, and citizen-centric services. By implementing this master plan, Madhesh Province aims to establish itself as a model for e-governance in Nepal, ensuring sustainable development and a better quality of life for its citizens.

This master-plan shall enable less-paper government in Madhesh province in 10 years encouraging transparency, effective and efficient e-governance.

7.2 RECOMMENDATIONS

For the successful implementation of E-GMP at Madhesh province, we recommend that all activities in the plan must be implemented within the proposed year such as

ICT Council must be formed in year-1. The development and approval of the ICT Council Act is a preliminary task and might be referred from Lumbini Province if required.

Recruitment: The ICT HR recruitment for vacant positions must be done within year-1&2.

Data Center: It is recommended to establish own data center but only upon identifying performance of ICT Council. ICT council must be able to take the responsibility of the Data Center. Until then, GIDC can be used for hosting and server needs.

Systems in-use: All developed, tested systems (federal systems, systems from other provinces etc) must be implemented in the province within 4 years of time. This shall only require some implementation cost and will refrain development cost.

Centralized Website System must be developed and implemented in year-1. Since it is a client facing site with lots of ongoing changes, support and maintenance required, ongoing AMC and upgradation must be done to maintain security as per OWASP top 10 web securities.

CM Dashboard must be developed and implemented. Any ministries or agencies providing e-service must link their system to this dashboard enabling digital image and statistics of Madhesh province to the Dashboard.

Integrated Municipality system must be developed within year-1 and upgradation of system for next 4 years is recommend for LG. This will cut down cost on developing or buying same system repeatedly by 136 LGs. Also, integrated system can be managed by one server and thus, it will cut down demand of servers for different LGs.

Digital Literacy to citizens must be continued on an ongoing basis for all 10-years. The people of Madhesh must be ready for e-services.

Agriculture and Livestock system must be developed in year-2&3 to help Madhesh focus on its one of the prioritized sector.

Capacity Building and training programs must be conducted on an ongoing way for next 10 years for Government Officers. The training should focus on better system management, operation, maintenance, backup, security and other ICT activities.

EHR must be developed in year-3 and should be upgraded and maintained as per the need. Newer modules shall be added to accumulate all vital needs of health sector.

Integrated Tourism MIS must be developed and linked with federal system to promote tourism industry.

Integrated Transport System must be developed and linked with federal system to track vehicle registration and renewal.

Integrated Forest MIS must be developed to track forestry information of Madhesh province.

E-Learning Management system must be developed to encourage self-learning and skill development in different fields.

Skill Bank: Talent Acquisition system must be developed to help skilled resources get recognized for their skills. This shall link all stakeholders in the job-market such as ESSP, TSP, EP, JS etc.

Integrated Youth and Sports MIS must be developed to encourage and motivate youths and promote sportsperson.

E-GMP Review: It is recommended that OCMCM, Madhesh province, thoroughly reviews the master plan and makes necessary amendments annually to account for changes in technology, service expansion, infrastructure establishment, government software and services implementation, leadership transitions, and availability of extra budget beyond the initial plan. Madhesh province must review and update e-GMP based on targeted achievements and actual progress made, making any necessary modifications as required. Evaluation of E-GMP twice a year should be done to identify if the master-plan is being adapted as scheduled or not.

MPG should also follow on following Non-functional recommendations for better e-GMP implementations

Open Standard: The systems must be developed using open standard that can be made available and adopted and implemented by anyone with proprietary permission.

Data Exchange: The systems must have provision for API for data exchange across different systems.

Policies: System's use and operation policy, ICT policies for MPG must be developed. Proposed ICT council should take lead on policy formulation and implementation.

ICT Policies and Guidelines: The MPG should establish and enforce ICT policies and guidelines that can serve as a foundation for achieving consistency, overseeing, and supervising activities.

Any ICT activities must follow **GEA** guidelines. Similarly, website and mobile app development must follow Website Development and Mobile App Development guidelines.

Value Realization: The province government should align its objectives, priorities, and outcomes with the strategies, projects, and priorities identified by the e-GMP. It is essential to emphasize all relevant stakeholders, such as politicians, government officials, private sectors, and citizens, that e-GMP is designed for long-term benefits of Madhesh province.

Awareness: Awareness programs should be conducted to ensure that all stakeholders, including users, government officials, and other relevant parties, are well-informed about the projects identified by the e-GMP.

It is crucial to have an ample discussions and consultations with stakeholders, including government officials, businesses, and citizens, for the successful implementation of e-GMP in Madhesh province.

Application Security: The OWASP top 10 security risks must be taken in consideration and checked before implementing any web applications.

Budget Allocation and Prioritization: Adequate budget allocation for the execution of e-GMP and its projects should be prioritized and addressed beforehand in the fiscal policies and budgets. During the budget planning for ICT domain, it is recommended to prioritize both Working Capital Expense and Capital Expenditure.

Localization: The systems developed may have provision for local language for interface. This will also increase participation of service seekers.

Curriculum Inclusion: The inclusion of e-Governance and e-commerce in the academic curriculum is essential.

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