International Journal of Engineering Science Invention Research & Development; Vol. 10, Issue 8, February 2024
www.ijesird.com, E-ISSN: 2349-6185

# INSTITUTIONAL AND POLICY CHALLENGES IN IMPLEMENTING E-GOVERNANCE IN FEDERAL NEPAL: EVIDENCE FROM MADHESH PROVINCE AND A PROVINCIAL DIGITAL GOVERNANCE MATURITY FRAMEWORK

Dr. Shreedhar Marasini[#], Dr. Abhijit Gupta[*]
[#]*Research and Development Department, Young Minds Creation Pvt. Ltd.*
[1]shree@youngminds.com.np, [2]abhi@youngminds.com.np

*Abstract*— **Digital transformation has become a strategic priority for governments seeking to improve public service delivery, transparency, and administrative efficiency. Although Nepal has shown steady progress in digital governance, significant differences exist in the digital readiness and e-governance maturity of provincial governments. This study assesses the digital readiness and e-governance maturity of Madhesh Province using evidence from the E-Governance Master Plan (EGMP). A mixed-methods approach was adopted, combining surveys, key informant interviews, focus group discussions, policy reviews, and institutional assessments. The Gartner E-Government Maturity Model was used to evaluate the province's level of digital transformation, while regression and thematic analyses identified key factors influencing e-governance adoption. The findings indicate that Madhesh Province has developed a basic foundation in ICT infrastructure and policy but remains at the** interaction stage **of e-governance maturity. Institutional fragmentation, limited coordination among government agencies, inadequate digital skills, insufficient investment, and weak cybersecurity governance continue to constrain progress toward transactional and transformational digital government. Building on the author's earlier work on e-readiness, information system auditing, and digital governance, this paper proposes a** Provincial Digital Governance Maturity Framework (PDGMF) **to guide digital transformation in federal systems. The study contributes a practical assessment framework and evidence-based policy recommendations that can support provincial governments in Nepal and other developing countries in advancing citizen-centric digital governance.**

***Keywords***— **Digital Readiness, E-Governance Maturity, Digital Government, Federal Governance, Provincial Digital governance, Digital Transformation, Madhesh Province, Nepal**

## I. INTRODUCTION

Digital technologies are transforming the way governments deliver public services, engage citizens, and manage public administration. Around the world, governments are investing in digital governance to improve transparency, efficiency, accountability, and service accessibility. The United Nations has recognized digital government as a key enabler of sustainable development and inclusive governance, encouraging countries to strengthen digital infrastructure, institutional capacity, and citizen-centered services[1]. While many developed countries have reached advanced levels of digital transformation, developing countries continue to face challenges related to infrastructure, policy implementation, institutional coordination, and digital skills[2][3].

Nepal has made significant progress in promoting e-governance through national policies such as the Digital Nepal Framework, the Information Technology Policy, and the e-Governance Master Plan. The country's performance in the United Nations E-Government Development Index (EGDI) has improved over recent years, reflecting advances in online services, telecommunications infrastructure, and human capital [1]. However, the implementation of digital governance remains uneven across provinces, particularly after the country's transition to a federal system in 2015. Provincial governments are now responsible for delivering many public services but often face institutional, financial, and technical constraints that limit digital transformation.

Madhesh Province is one of Nepal's most populous and economically important provinces. Although internet access and smartphone use have increased rapidly, the adoption of digital public services remains relatively low. Government agencies continue to rely on fragmented information systems, manual processes, and limited inter-agency coordination. Moreover, there is no standardized framework for assessing digital readiness and e-governance maturity at the provincial level.

This study evaluates the digital readiness and e-governance maturity of Madhesh Province using evidence from the E-Governance Master Plan (EGMP). Building on the author's previous

research on e-readiness, information system auditing, cybersecurity, and digital governance[4][5][6][7], the study proposes a Provincial Digital Governance Maturity Framework (PDGMF). The findings provide evidence-based policy recommendations to support digital transformation in Nepal's federal system and offer practical insights for other developing countries pursuing citizen-centric digital governance.

## II. Literature Review

An easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.

Digital transformation has fundamentally changed the way governments design policies, deliver public services, and engage with citizens. E-governance has evolved from providing basic online information to delivering integrated, citizen-centric, and data-driven public services. According to Heeks (2006), successful e-governance extends beyond the adoption of information and communication technologies (ICTs); it requires institutional reform, organizational readiness, effective governance, and continuous capacity development[2]. More recent studies have reinforced this view, emphasizing that digital government should be considered a long-term governance transformation rather than merely a technological initiative [8][9].

The United Nations has consistently highlighted digital government as a key enabler of sustainable development and public sector modernization. The United Nations E-Government Survey 2024 indicates that countries with stronger digital governance frameworks, better telecommunications infrastructure, and higher human capital achieve better public service outcomes and greater citizen participation[1]. Nepal has gradually improved its E-Government Development Index (EGDI) over the past decade, reflecting progress in online service delivery, telecommunications infrastructure, and digital capacity. However, national indicators often conceal disparities between provinces, making subnational assessments increasingly important [1].

Digital readiness has emerged as one of the most widely used concepts for evaluating an organization's preparedness for digital transformation. It refers to the extent to which institutions possess the infrastructure, governance mechanisms, human resources, financial capacity, and organizational commitment necessary to implement digital government successfully[2][9][3] further argue that digital readiness should be assessed through both technological and institutional dimensions because governance quality significantly influences the success of e-government initiatives.

In Nepal, some of the earliest empirical studies on digital readiness were conducted by Gupta, Marasini, and Shakya (2015), who assessed the e-readiness of Nepalese ministries for implementing e-government[6]. Their study identified considerable differences in ICT infrastructure, institutional capacity, strategic planning, and human resources across ministries, concluding that organizational readiness was as important as technological infrastructure for successful implementation. Similarly, Marasini and Shakya examined e-readiness in the human resource management domain and found that limited ICT skills, weak organizational commitment, and insufficient policy implementation significantly constrained digital transformation[10]. Another study by Marasini and Shakya emphasized that inadequate ICT infrastructure and poor institutional preparedness continued to hinder the implementation of e-government in Nepal[11]. Together, these studies established an important foundation for understanding digital readiness in the Nepalese public sector.

Information system governance and cybersecurity are equally important components of successful e-governance. Public trust in digital government depends on the confidentiality, integrity, and availability of government information systems. Gupta and Shakya argued that information system auditing should be integrated into e-government implementation to strengthen accountability, transparency, and operational effectiveness[4]. Their IEEE conference paper highlighted that many government institutions lacked systematic auditing

mechanisms despite increasing digitalization efforts[5]. Expanding this work, Gupta and Shakya identified several security challenges facing Nepalese public organizations, including inadequate security policies, weak governance structures, and limited risk management practices[4]. In another study, Gupta and Shakya examined cloud computing security challenges and emphasized that digital government initiatives require robust cybersecurity frameworks and continuous information system auditing to maintain citizen trust and service reliability[12]. These studies collectively demonstrate that digital transformation cannot succeed without strong governance and security mechanisms.

The evolution of e-governance has also shifted attention from technology adoption to strategic digital governance. Recent studies argue that digital infrastructure has become a strategic national asset that supports economic development, public administration, and international engagement[8].

Several maturity models have been developed to measure the evolution of digital government. Among them, the Gartner E-Government Maturity Model remains one of the most widely applied frameworks, classifying digital government into four stages: Information, Interaction, Transaction, and Transformation. Governments progress through these stages as they improve digital service delivery, interoperability, organizational integration, and citizen engagement. Although maturity models have been widely applied at the national level, relatively few studies have examined digital maturity at the provincial or subnational level in developing federal systems [3][9].

Despite growing interest in digital governance, significant research gaps remain. Existing studies in Nepal have primarily focused on central government ministries, ICT infrastructure, information system security, and organizational readiness[6][4][5][12][7]. There is currently no comprehensive framework for evaluating how institutional readiness, governance capacity, policy implementation, interoperability, and citizen adoption collectively influence digital transformation at the provincial level.

This study addresses these gaps by assessing the digital readiness and e-governance maturity of Madhesh Province using evidence from the E-Governance Master Plan (EGMP). Building upon previous research on e-readiness, information system auditing, cybersecurity, and digital governance, the study proposes a Provincial Digital Governance Maturity Framework (PDGMF) that integrates institutional readiness, governance effectiveness, digital infrastructure, and service transformation into a unified assessment model. The proposed framework contributes to both theory and practice by extending digital readiness research from national institutions to provincial governments in federal and developing countries.

## III. Methodology

This study adopted a mixed-methods research design to assess the digital readiness and e-governance maturity of Madhesh Province. Data were collected through published EGMP for Madhesh province which included surveys, Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs) conducted during the preparation of the E-Governance Master Plan (EGMP). Secondary data were obtained from policy documents, government reports, and the **United Nations E-Government Survey**. The **Gartner E-Government Maturity Model** was used to evaluate the province's maturity level across four stages: Information, Interaction, Transaction, and Transformation. Quantitative data were analyzed using descriptive statistics and regression analysis, while qualitative data were examined through thematic analysis to identify institutional, policy, and technological factors influencing digital transformation. This mixed-methods approach provided a comprehensive assessment of provincial digital governance readiness.

## IV. Results and Findings

The assessment indicates that Madhesh Province has established a basic foundation for digital governance but has not yet achieved institutional readiness for integrated digital public service delivery. Based on the Gartner E-Government Maturity Model, the province is positioned at the

Interaction Stage, where government agencies provide online information and limited two-way communication but lack fully integrated transactional and citizen-centric digital services.

The analysis identified five major dimensions influencing digital readiness: ICT infrastructure, institutional governance, human resource capacity, policy and regulatory framework, and financial sustainability. While internet connectivity and basic ICT infrastructure have improved across provincial ministries, institutional coordination, interoperability, cybersecurity governance, and digital skills remain significant constraints.

### *A. Digital Readiness Assessment*

TABLE 1.
Conceptual Assessment of Digital Readiness in Madhesh Province

| Dimension | Current Status | Readiness Level | Key Observation |
|---|---|---|---|
| ICT Infrastructure | Moderate | Moderate | Basic connectivity exists but infrastructure is uneven across agencies. |
| Institutional Governance | Weak | Low | No dedicated provincial ICT governance authority. |
| Human Resource Capacity | Moderate | Low | Limited digital skills and shortage of specialized ICT professionals. |
| Policy & Regulatory Framework | Moderate | Moderate | Provincial policies exist but implementation is inconsistent. |
| Financial Sustainability | Weak | Low | ICT investment is project-based with limited long-term funding. |

The assessment suggests that technological readiness has progressed faster than institutional and organizational readiness, creating implementation gaps.

### *B. E-Government Maturity Assessment*

Using the Gartner Maturity Model, the province was assessed across four maturity stages.

TABLE 2.
E-Government Maturity Assessment

| Maturity Stage | Status |
|---|---|
| Information | Achieved |
| Interaction | Largely Achieved |
| Transaction | Partially Achieved |
| Transformation | Not Achieved |

Government websites primarily provide information and downloadable forms. Some agencies have introduced online registration and application services, but integrated transactions, digital payments, and cross-agency service delivery remain limited.

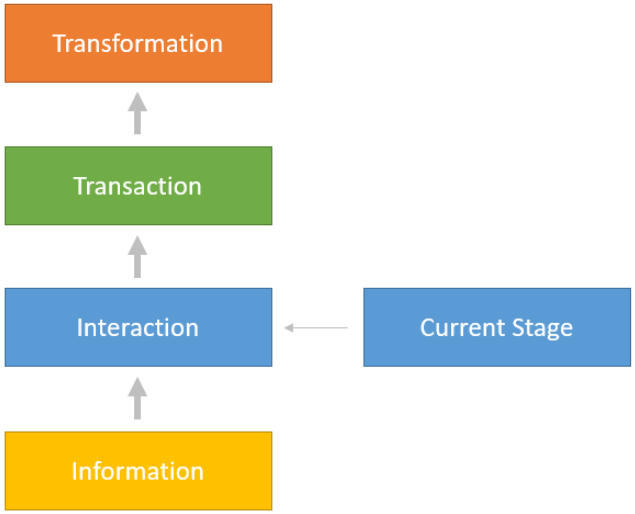


Fig 1. Current Position of Madhesh Province in the Gartner Maturity Model

### *C. Institutional Challenges*

Findings from KIIs and FGDs consistently highlighted institutional issues as the primary barriers to digital transformation.

TABLE 3.
Institutional Challenges Identified

| Challenge | Effect on E-Governance |
|---|---|
| Fragmented institutional structure | Delayed implementation |
| Weak inter-agency coordination | Duplication of systems |
| Lack of interoperability standards | Data silos |
| Limited ICT workforce | Slow adoption |
| Weak cybersecurity governance | Reduced public trust |

Participants emphasized that existing digital initiatives are implemented independently by individual agencies without a common governance framework.

### *D. Factors Affecting Digital Readiness*

The thematic analysis identified five critical success factors.

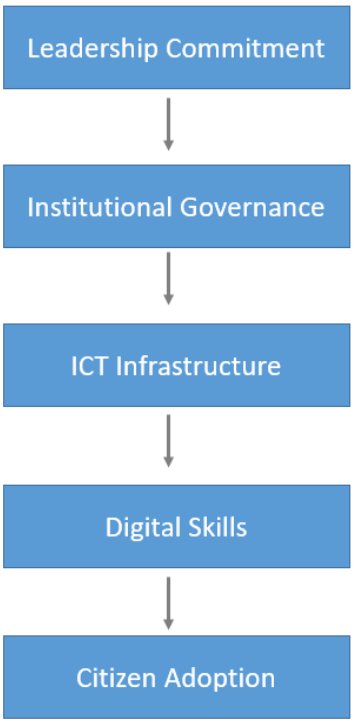


Fig 2. Factors Influencing Digital Readiness

Leadership and institutional coordination emerged as the strongest enabling factors for digital transformation.

*E. Proposed Provincial Digital Governance Maturity Framework (PDGMF)*

The findings support the development of a Provincial Digital Governance Maturity Framework that integrates institutional readiness with digital transformation outcomes.

The framework illustrates that digital maturity depends not only on technology but also on governance structures, institutional capacity, interoperability, and citizen engagement.

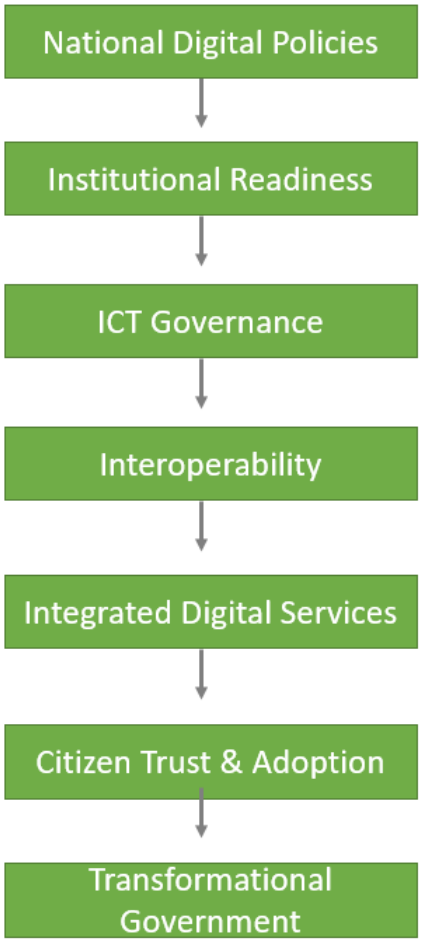


Fig 3. Provincial Digital Governance Maturity Framework

*F. Comparative Analysis*

Table 4. Comparison of Digital Governance Characteristics

| Country/Region | Governance Structure | Maturity Level | Key Lesson |
|---|---|---|---|
| Estonia | Centralized Digital Authority | Transformation | Integrated digital identity and services |
| India | National Digital Mission | Transaction–Transformation | Shared digital platforms and interoperability |
| Sri Lanka | ICT Agency | Transaction | Strong institutional coordination |
| Madhesh Province | Department-led initiatives | Interaction | Need for integrated governance and interoperability |

The comparison indicates that countries with dedicated digital governance institutions and standardized interoperability frameworks have achieved higher levels of digital maturity than Madhesh Province.

## V. Discussion

The findings indicate that Madhesh Province has made moderate progress in digital readiness but remains at the interaction stage of e-governance maturity. Although ICT infrastructure and internet connectivity have improved, institutional fragmentation, limited coordination, inadequate digital skills, and weak cybersecurity governance continue to impede digital transformation. These findings are consistent with earlier studies on Nepal's e-readiness and information system governance [6][5][12]. They also support recent research emphasizing that digital transformation depends on institutional capacity, effective governance, and strategic leadership rather than technology alone[9][1].

## VI. Policy Implications

The study suggests that Madhesh Province should strengthen its institutional and policy framework to accelerate digital transformation. Establishing a Provincial ICT Council with clearly defined responsibilities would improve governance and coordination among provincial agencies. The government should adopt interoperability standards, strengthen cybersecurity governance, and allocate dedicated funding for digital infrastructure and capacity building. Public–private partnerships can provide technical expertise and encourage innovation in service delivery. Regular monitoring using digital governance performance indicators and maturity assessments will support evidence-based decision-making and help the province progress toward integrated, citizen-centric, and sustainable digital governance.

## VII. Conclusion

This study assessed the digital readiness and e-governance maturity of Madhesh Province using a mixed-methods approach and the Gartner Maturity Model. The findings show that while foundational ICT infrastructure and policy initiatives are in place, significant institutional and organizational challenges remain. The proposed **Provincial Digital Governance Maturity Framework (PDGMF)** provides a practical approach for evaluating and guiding digital transformation at the provincial level. The study extends previous research on e-readiness and information system governance in Nepal by focusing on federal implementation. Its findings offer valuable policy insights for strengthening digital governance in Nepal and other developing countries with decentralized governance systems.

## References

[1] United Nations Department of Economic and Social Affairs (UNDESA), United Nations E-Government Survey 2024: Accelerating Digital Transformation for Sustainable Development, New York, 2024.

[2] R. Heeks, Implementing and Managing E-Government, London: U.K.: Sage Publications, 2006.

[3] Akpan-Obong et al, "E-governance and governance: Perspectives from developing countries," *Information Technology for Development,* vol. 28, no. 4, 2022.

[4] A. Gupta and S. Shakya, "Information System Audit: A study for security and challenges in Nepal," *International Journal of Computer Science and Information Security (IJCSIS),* vol. 13, no. 11, 2015.

[5] A. Gupta and S. Shakya, "Information System Audit: An Overview study in e-government of Nepal," in *IEEE, International Conference of Green Computing and Internet of Things,* Galgotia University, Delhi, 2015.

[6] A. Gupta, S. Marasini and S. Shakya, "E-Readiness Assessment for Ministries of Nepal for Implementation of e-Government," *2015 International Conference on Data Mining, Electronics and Information Technology (DMEIT'15) August 10-11, 2015 Pattaya, Thailand,* vol. ERPUB, 2015.

[7] A. Gupta and S. Marasini, "Digital Readiness and E-Governance Maturity in Madhesh Province, Nepal: Assessing Institutional Readiness, Adoption Factors, and Pathways to Digital Transformation," *International Journal of Engineering Science Invention Research & Development (IJESIRD),* 2023.

[8] V. I. Espinosa and A. Pino, "E-government as a development strategy: Evidence from developing countries," *International Journal of Public Administration,* vol. 47, 2024.

[9] M. Di Giulio and G. Vecchi, "Implementing digitalization in the public sector: Challenges and opportunities," *Public Policy and Administration,* vol. 36, no. 4, 2021.

[10] S. Marasini and S. Shakya, "E-Readiness to Implement E-Government: An Overview Study in HR Domain in Nepal," in *Proc. IEEE Int. Conf. Green Computing and Internet of Things (ICGCIoT),* Noida, Delhi, 2015.

[11] S. Marasini and S. Shakya, "E-Readiness: A Study of Infrastructure for E-Government of Nepal,"

International Journal of Mobile Computing and Computer Science," *International Journal of Mobile Computing and Computer Science*, vol. 4, no. 12, 2015.

[12] A. Gupta and S. Shakya, "Information System Audit: Cloud Computing Security and Challenges," *International Journal of Computer Science and Mobile Computing*, vol. 4, no. 11, pp. 48-56, 2015.