INTERNATIONAL JOURNAL OF MANAGEMENT AND ORGANIZATIONAL RESEARCH

# Rectifying Policy Barriers: An Industry-Led Critical Analysis of Nepal's IoT Landscape

**Udit Prasad Bhattarai [1*], Dr. Suman Thapaliya [2]**
[1] Department of Information Technology, Texas College of Management and IT, Kathmandu, Nepal
[2] Department of Information Technology, Lincoln University College, Malaysia

* Corresponding Author: **Udit Prasad Bhattarai**

## Article Info

**ISSN (online):** 2583-6641
**Impact Factor (RSIF):** 8.56
**Volume:** 05
**Issue:** 03
**May-June 2026**
**Received:** 09-04-2026
**Accepted:** 08-05-2026
**Published:** 07-06-2026
**Page No:** 170-173

**Abstract**
The adoption of the Internet of Things (IoT) in developing economies is often constrained not only by technological and financial limitations but also by inadequate policy and regulatory frameworks. In Nepal, while IoT initiatives are gradually emerging, the absence of coherent policies, unclear regulatory guidelines, and limited institutional coordination continue to hinder large-scale implementation. This study critically examines the policy barriers affecting IoT adoption in Nepal from an industry-led perspective, focusing on how regulatory gaps influence technological deployment and innovation.
A mixed-method approach was employed, combining quantitative data collected through structured questionnaires with qualitative insights from industry professionals engaged in IoT-related activities. The analysis evaluates key dimensions such as regulatory clarity, institutional support, data governance, standardization, and policy awareness. Descriptive statistics and reliability analysis were conducted using SPSS, while qualitative responses were thematically analyzed to identify recurring challenges and industry concerns.
The findings reveal that policy-related barriers are among the most significant constraints to IoT adoption in Nepal. Key issues include lack of clear regulatory frameworks, weak enforcement mechanisms, limited data protection policies, and insufficient coordination among governing bodies. These challenges create uncertainty for industry stakeholders, reducing investment confidence and slowing innovation. While technological readiness and market potential exist, their impact is constrained by an underdeveloped policy environment.
This study contributes to the literature by providing an industry-focused empirical analysis of policy barriers in IoT adoption within a developing country context. It offers practical recommendations for policymakers to design clear, supportive, and forward-looking regulatory frameworks that can enable sustainable IoT ecosystem development in Nepal.

**Keywords:** Internet of Things (IoT), Policy Barriers, Regulation, Nepal, Technology Adoption, Industry Perspective, Digital Governance

## 1. Introduction

### 1.1. Background

The Internet of Things (IoT) has become a key driver of digital transformation, enabling real-time data exchange and automation across sectors such as healthcare, agriculture, manufacturing, and smart cities (Atzori *et al*., 2010; Porter & Heppelmann, 2014) [1, 9]. Globally, governments play a crucial role in fostering IoT adoption through supportive policies, regulatory clarity, and institutional coordination.
In developing countries like Nepal, IoT adoption is gradually emerging, supported by improvements in ICT infrastructure and

growing interest from private sector stakeholders. However, the policy environment has not evolved at the same pace as technological advancements. As a result, IoT development remains fragmented, with limited regulatory guidance and weak institutional alignment.

### 1.2. Motivation

While existing research has highlighted technological and economic barriers to IoT adoption, there is increasing recognition that policy and regulatory factors play a decisive role in shaping adoption outcomes. In the absence of clear policies, industry actors face uncertainty regarding compliance, data governance, and operational standards.

In Nepal, limited attention has been given to understanding policy barriers from the industry perspective, despite the private sector being a primary driver of IoT innovation. This creates a need to critically examine how regulatory challenges affect industry participation and technological growth.

### 1.3. Problem Statement

Despite the growing potential of IoT in Nepal, the lack of a well-defined and supportive policy framework presents a major obstacle to its adoption. Issues such as regulatory ambiguity, absence of data protection standards, and weak coordination among governing bodies hinder effective implementation.

Existing studies often address policy challenges in a general manner, without providing empirical evidence from industry stakeholders. This creates a gap in understanding how policy barriers directly impact IoT adoption and innovation in Nepal.

### 1.4. Objectives

The main objective of this study is to critically analyze policy barriers affecting IoT adoption in Nepal from an industry-led perspective. The specific objectives are:

- To identify key policy and regulatory barriers influencing IoT adoption
- To examine industry perceptions of the existing policy environment
- To analyze the impact of regulatory gaps on IoT implementation
- To provide recommendations for improving policy frameworks to support IoT growth

### 1.5. Contribution of the Study

This study contributes to the literature by providing an empirical, industry-focused analysis of policy barriers in IoT adoption within a developing country context. It highlights the critical role of governance and regulatory clarity in shaping technology adoption outcomes.

Furthermore, the study offers practical insights for policymakers to design more effective, coordinated, and forward-looking policies that can support sustainable IoT ecosystem development in Nepal.

## 2. Literature Review

### 2.1. IoT Adoption and Policy Environment

The adoption of the Internet of Things (IoT) is not only driven by technological readiness and economic feasibility but is also heavily influenced by the policy and regulatory environment. Governments play a crucial role in enabling IoT ecosystems by establishing clear regulations, standards, and incentives (Lee & Lee, 2015) [7]. In many developing economies, however, policy frameworks often lag behind technological advancements, creating barriers to adoption.

Studies indicate that unclear regulations, lack of standardization, and weak institutional support can significantly hinder IoT deployment (Madakam *et al*., 2015) [8]. In such contexts, even when technological infrastructure exists, the absence of a supportive policy environment leads to uncertainty and slows down innovation.

### 2.2. Theoretical Perspectives on Policy and Technology Adoption

Technology adoption has been widely explained through frameworks such as the Technology–Organization–Environment (TOE) model, which highlights the role of environmental factors, including regulatory and policy conditions (Tornatzky & Fleischer, 1990) [13]. Within this framework, government policies, industry regulations, and institutional support are considered critical external factors influencing adoption decisions.

Additionally, Institutional Theory suggests that organizations respond to regulatory pressures, norms, and governance structures when adopting new technologies (Scott, 2001) [12]. In the context of IoT, institutional voids or weak governance mechanisms can create uncertainty, limiting organizational willingness to invest in new technologies.

### 2.3. Key Policy Barriers in IoT Adoption

Existing literature identifies several policy-related barriers that affect IoT adoption, particularly in developing countries:

- **Regulatory Uncertainty:** Lack of clear legal frameworks governing IoT implementation and usage
- **Data Governance Issues:** Absence of data protection laws and privacy regulations
- **Standardization Gaps:** Lack of technical standards and interoperability guidelines
- **Institutional Fragmentation:** Poor coordination among government agencies and stakeholders
- **Limited Policy Awareness:** Low awareness among industry actors regarding existing policies

These barriers not only increase operational risks but also reduce investor confidence and slow the pace of innovation.

### 2.4. Industry Perspective on Policy Challenges

From an industry standpoint, policy barriers often translate into practical challenges such as compliance uncertainty, increased operational costs, and limited scalability. Firms operating in emerging IoT markets require predictable and supportive regulatory environments to innovate and expand (Porter & Heppelmann, 2014) [9].

Empirical studies highlight that when policies are unclear or inconsistent, firms tend to adopt a cautious approach, delaying investment and limiting experimentation. Conversely, well-defined policies and incentives can accelerate adoption by reducing uncertainty and encouraging collaboration between public and private sectors.

### 2.5. Research Gap

Although prior studies have acknowledged the importance of policy in technology adoption, there is a lack of empirical, industry-focused research examining policy barriers in the

context of IoT adoption in Nepal. Most existing studies provide general insights without capturing the perspectives of industry stakeholders directly involved in IoT development. This study addresses this gap by offering a critical, industry-led analysis of policy barriers, providing evidence-based insights into how regulatory challenges affect IoT adoption in Nepal.

## 3. Methodology

### 3.1. Research Design

This study adopts a mixed-method approach, integrating quantitative and qualitative techniques to critically analyze policy barriers affecting IoT adoption in Nepal. The design is descriptive and analytical, focusing on identifying key regulatory challenges from an industry perspective.

### 3.2. Data Collection

Primary data were collected through a structured questionnaire targeting IoT professionals, firms, and stakeholders in Nepal. The questionnaire used a 5-point Likert scale along with selected open-ended questions to capture industry insights on policy challenges. Purposive sampling was applied to ensure relevant respondents.

### 3.3. Data Analysis

Quantitative data were analyzed using SPSS, applying descriptive statistics (mean, standard deviation) and Cronbach's Alpha (≥ 0.70) for reliability. Qualitative responses were analyzed using thematic interpretation to support quantitative findings.

### 3.4. Variables

**Table 1:** Study Variables

| Variable Type | Variables Included |
|---|---|
| Dependent | IoT Adoption |
| Independent | Regulatory Clarity, Data Governance, Standardization, Institutional Support |
| Mediating | Policy Awareness |

### 3.5. Ethical Considerations

Participation was voluntary, and respondent confidentiality was maintained. Data were used strictly for academic purposes.

## 4. Results

### 4.1. Descriptive Statistics

Descriptive analysis was conducted to assess industry perceptions of policy-related factors influencing IoT adoption in Nepal.

**Table 2:** Descriptive Statistics

| Variable | Mean | Std. Deviation |
|---|---|---|
| IoT Adoption | 3.41 | 0.73 |
| Regulatory Clarity | 2.88 | 0.81 |
| Data Governance | 2.76 | 0.85 |
| Standardization | 2.69 | 0.79 |
| Institutional Support | 2.94 | 0.77 |
| Policy Awareness | 3.12 | 0.70 |

The results indicate that all policy-related variables have mean values below or near the neutral threshold (3.0), suggesting overall dissatisfaction among industry respondents. Standardization (Mean = 2.69) and Data Governance (Mean = 2.76) are the weakest areas, reflecting significant gaps in technical guidelines and data protection frameworks.

### 4.2. Reliability Analysis

Reliability testing was conducted using Cronbach's Alpha to assess internal consistency.

**Table 3:** Reliability Statistics

| Construct | Cronbach's Alpha |
|---|---|
| Overall Scale | 0.84 |

The Cronbach's Alpha value of 0.84 indicates good reliability, confirming the consistency of the measurement scale.

### 4.3 Key Findings

- Policy barriers are significant constraints to IoT adoption in Nepal.
- Standardization and data governance are the weakest areas, indicating lack of technical and regulatory clarity.
- Regulatory clarity and institutional support are insufficient, creating uncertainty for industry stakeholders.
- Policy awareness shows moderate levels, suggesting that even existing policies are not effectively communicated or understood.

Overall, the findings demonstrate that IoT adoption in Nepal is constrained more by policy and regulatory weaknesses than by technological limitations.

## 5. Discussion

The findings of this study clearly indicate that policy and regulatory barriers are a major constraint to IoT adoption in Nepal. The low mean values across key policy variables-particularly standardization and data governance-suggest that the existing policy environment is not adequately supporting technological innovation. This aligns with prior studies that emphasize the importance of regulatory frameworks in enabling IoT ecosystems (Lee & Lee, 2015; Madakam *et al*., 2015) [7, 8].

The weak performance of standardization highlights the absence of clear technical guidelines and interoperability frameworks. In IoT systems, standardization is critical for ensuring compatibility across devices and platforms. Without it, industry stakeholders face challenges in scaling solutions and integrating technologies, which ultimately slows adoption. This finding reinforces the argument that technical governance is as important as infrastructure in IoT development.

Similarly, the low score for data governance reflects significant concerns regarding data privacy, security, and ownership. In the absence of clear data protection laws, firms may be reluctant to invest in IoT solutions that rely heavily on data collection and processing. This supports the perspective of Institutional Theory, which suggests that weak regulatory structures create uncertainty and reduce organizational willingness to adopt new technologies (Scott, 2001) [12].

The results also show that regulatory clarity and institutional support are insufficient, indicating fragmented governance and lack of coordinated policy direction. This is consistent

with the Technology–Organization–Environment (TOE) framework, where environmental factors such as government support play a crucial role in shaping adoption decisions (Tornatzky & Fleischer, 1990) [13]. In Nepal's case, the absence of clear policies and coordinated institutional mechanisms limits the effectiveness of otherwise available technological and market opportunities.

The moderate level of policy awareness suggests that even when policies exist, they are not effectively communicated or accessible to industry stakeholders. This gap between policy formulation and implementation further weakens the overall regulatory environment.

From an industry perspective, these policy barriers translate into practical challenges such as increased risk, uncertainty in compliance, and limited scalability of IoT solutions. As a result, firms may adopt a cautious approach, delaying investment and innovation.

Overall, the study highlights that policy is not merely a supporting factor but a foundational requirement for IoT adoption. Without a clear, consistent, and well-communicated policy framework, the potential of IoT in Nepal is unlikely to be fully realized.

## 6. Conclusion and Recommendations

### 6.1. Conclusion

This study critically examined policy barriers affecting IoT adoption in Nepal from an industry-led perspective. The findings reveal that policy and regulatory weaknesses are among the most significant constraints to IoT development. Key issues such as lack of standardization, weak data governance frameworks, unclear regulations, and limited institutional coordination create uncertainty for industry stakeholders and hinder large-scale implementation.

While Nepal shows potential in terms of technological readiness and market opportunities, these advantages are constrained by an underdeveloped policy environment. The study concludes that effective IoT adoption is highly dependent on strong, clear, and coordinated policy frameworks, without which innovation remains fragmented and limited in scope.

### 6.2. Recommendations

Based on the findings, the following recommendations are proposed:

- **Develop Clear Regulatory Frameworks:** Establish comprehensive and well-defined policies specifically addressing IoT deployment, usage, and compliance.
- **Strengthen Data Governance:** Introduce robust data protection laws and guidelines to ensure privacy, security, and trust in IoT systems.
- **Promote Standardization:** Develop technical standards and interoperability frameworks to enable seamless integration of IoT technologies.
- **Enhance Institutional Coordination:** Improve collaboration among government agencies, regulatory bodies, and industry stakeholders to create a unified policy direction.
- **Increase Policy Awareness:** Conduct awareness programs and industry engagement initiatives to ensure that stakeholders understand and can effectively utilize existing policies.
- **Provide Incentives and Support Mechanisms:** Introduce incentives such as tax benefits, funding programs, and innovation grants to encourage IoT adoption and investment.

By addressing these policy barriers, Nepal can create a more enabling environment for IoT innovation and accelerate its transition toward a digitally integrated economy.

## References


1. Atzori L, Iera A, Morabito G. The Internet of Things: a survey. Comput Netw. 2010;54(15):2787-805.
2. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Q. 1989;13(3):319-40.
3. Etzkowitz H, Leydesdorff L. The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. Res Policy. 2000;29(2):109-23.
4. Gubbi J, Buyya R, Marusic S, Palaniswami M. Internet of Things (IoT): a vision, architectural elements, and future directions. Future Gener Comput Syst. 2013;29(7):1645-60.
5. Hair JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. 7th ed. Pearson; 2010.
6. Kumar NM, Mallick PK. Blockchain technology for security issues and challenges in IoT. Procedia Comput Sci. 2019;132:1815-23.
7. Lee I, Lee K. The Internet of Things (IoT): applications, investments, and challenges for enterprises. Bus Horiz. 2015;58(4):431-40.
8. Madakam S, Ramaswamy R, Tripathi S. Internet of Things (IoT): a literature review. J Comput Commun. 2015;3(5):164-73.
9. Porter ME, Heppelmann JE. How smart, connected products are transforming competition. Harv Bus Rev. 2014;92(11):64-88.
10. Powell WW, Koput KW, Smith-Doerr L. Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. Adm Sci Q. 1996;41(1):116-45.
11. Rogers EM. Diffusion of innovations. 5th ed. Free Press; 2003.
12. Scott WR. Institutions and organizations. 2nd ed. Sage Publications; 2001.
13. Tornatzky LG, Fleischer M. The processes of technological innovation. Lexington Books; 1990.



## How to Cite This Article

Bhattarai UP, Thapaliya S. Rectifying policy barriers: an industry-led critical analysis of Nepal's IoT landscape. Int J Manag Organ Res. 2026;5(3):170-173.