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**ELECTRONIC BUILDING PERMIT SYSTEM (EBPS) IN NEPAL:  
DESIGNERS' PERCEPTION, USABILITY, AND ADMINISTRATIVE  
EFFICIENCY IN TOKHA MUNICIPALITY**

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**ABSTRACT**

The digitalization of public services has become an important strategy for improving transparency, efficiency, and accountability in urban governance. In Nepal, the Electronic Building Permit System (EBPS) has been introduced in several municipalities to modernize the traditional paper-based building permit process. This study evaluates designers' perceptions regarding the usability, functionality, efficiency, and responsiveness of the Electronic Building Permit System implemented in Tokha Municipality, Kathmandu Valley, Nepal. A mixed-method research approach was adopted, combining quantitative and qualitative methods. Quantitative data were collected through a structured five-point Likert scale questionnaire administered to registered designers including engineers, architects, and urban planners actively involved in the permit approval process. Qualitative information was obtained through focused group discussions with designers and municipal technical officials. Statistical tools including descriptive statistics, mean score analysis, Cronbach's alpha reliability testing, Relative Importance Index (RII), and correlation analysis were applied for interpretation of findings.

The results reveal that designers generally possess a positive perception of the system. Real-time application tracking (RII = 0.899), user-friendly interface (RII = 0.893), and ease of navigation (RII = 0.890) emerged as the highest-ranked features. The system was also appreciated for reducing physical office visits, improving workflow management, and

supporting faster permit processing. However, challenges remain in areas such as timely issue resolution (RII = 0.687), municipal responsiveness (RII = 0.740), and regular updating of building regulations (RII = 0.672). Correlation analysis indicated that system functionality and usability have the strongest influence on overall user experience.

The study concludes that EBPS has significantly improved transparency, accessibility, and efficiency within Tokha Municipality's permit approval process. Nevertheless, continuous regulatory updates, stronger technical support systems, periodic capacity-building programs, and improved administrative responsiveness are necessary to ensure long-term sustainability and wider acceptance of the system. The findings contribute to the growing body of literature on e-governance and provide practical recommendations for municipalities in Nepal seeking to strengthen digital building permit systems.

**KEYWORDS:** Electronic Building Permit System, EBPS, e-governance, Tokha Municipality, designers' perception, building permit, Nepal, usability, efficiency.

## 1. INTRODUCTION

### 1.1 Background

Urbanization has increased rapidly across developing countries, creating significant pressure on municipalities to improve service delivery systems and strengthen urban governance mechanisms. One of the most important municipal services associated with urban development is the building permit approval process. Building permit systems ensure that construction activities comply with planning regulations, zoning requirements, structural safety standards, and environmental considerations. Efficient permit systems are therefore essential for sustainable urban development and disaster risk reduction.

Traditionally, the building permit approval process in Nepal has been conducted through manual and paper-based procedures. Applicants are generally required to physically submit drawings and documents, visit municipal offices repeatedly, and communicate directly with technical officials throughout the approval process. Such conventional systems often lead to procedural delays, inefficiency, administrative burden, lack of transparency, and increased opportunities for bureaucratic complications.

To overcome these limitations, the Government of Nepal introduced the Electronic Building Permit System (EBPS) under broader e-governance initiatives. The system was initially introduced through collaborative efforts involving municipalities, development partners, and technical institutions. EBPS aims to digitize the permit approval process through online

submission, automated document management, real-time application tracking, and digital approval systems.

Tokha Municipality, located within the Kathmandu Valley, is among the municipalities implementing the Electronic Building Permit System. The municipality has experienced rapid urban growth and increasing construction activities over the past decade. Consequently, there has been a growing need for efficient permit management systems capable of handling increasing application volumes while maintaining compliance with building regulations.

The successful implementation of any digital governance platform depends significantly on user experience and institutional adaptability. Designers, including engineers, architects, and urban planners, are among the primary users of the system because they are responsible for preparing and submitting technical drawings and responding to municipal feedback. Therefore, evaluating designers' experiences provides valuable insight into the practical effectiveness of the system.

### **1.2 Problem Statement**

Although EBPS has been introduced to improve efficiency and transparency, its practical effectiveness in Nepalese municipalities remains insufficiently studied. Several challenges may affect the operational success of the system, including technical limitations, insufficient support mechanisms, delayed responses from municipal authorities, and inadequate updating of regulations.

Furthermore, while institutional reports often focus on administrative performance indicators, limited research has examined the experiences and perceptions of designers who interact with the system regularly. Without understanding user perspectives, it becomes difficult to identify operational challenges, usability gaps, and opportunities for system enhancement.

### **1.3 Research Objectives**

The overall objective of this study is to evaluate designers' experiences with the Electronic Building Permit System in Tokha Municipality.

The specific objectives are:

1. To examine designers' perceptions regarding the use of EBPS.
2. To identify the key factors influencing user experience with the system.
3. To propose recommendations for improving usability, efficiency, and system performance.

### **1.4 Significance of the Study**

This study contributes both practically and academically. Practically, the findings provide Tokha Municipality with evidence-based insights for improving administrative responsiveness, system functionality, and technical support services. The study also supports policy-level decisions associated with digital municipal governance.

Academically, the research contributes to the limited body of literature concerning user-centered evaluation of electronic building permit systems in Nepal. The findings may also support future comparative studies related to e-governance and digital municipal service delivery in developing countries.

## **2. LITERATURE REVIEW**

### **2.1 Electronic Governance and Digital Transformation**

Electronic governance refers to the use of information and communication technologies to improve public administration, transparency, accountability, and service delivery. According to Heeks (2002), e-governance systems improve administrative efficiency while reducing bureaucratic complexity. Similarly, OECD (2020) highlighted that digital governance systems contribute significantly to public service modernization and citizen satisfaction.

The adoption of e-governance platforms has accelerated globally due to increased internet accessibility and technological advancements. Municipal governments increasingly utilize digital systems to improve urban management, particularly in permit approvals, taxation, utility management, and citizen services.

### **2.2 Electronic Building Permit Systems**

Electronic Building Permit Systems are web-based platforms designed to automate the building permit approval process. These systems typically allow online application submission, digital document uploading, workflow management, automated compliance checking, and real-time status tracking.

Internationally, several countries have successfully implemented electronic permit systems. Singapore's CORENET system integrates Building Information Modeling (BIM) with permit approvals, significantly reducing processing time and enhancing regulatory compliance. South Korea has also adopted BIM-supported electronic permit systems that facilitate automated rule checking and minimize manual review.

In Greece, electronic permitting implementation faced challenges associated with institutional fragmentation and technical infrastructure limitations. These experiences demonstrate that

technological capability alone does not guarantee successful implementation; institutional readiness and user adaptability are equally important.

### **2.3 Development of EBPS in Nepal**

In Nepal, the Electronic Building Permit System was introduced in 2012 under the Comprehensive Disaster Risk Management Program supported by the United Nations Development Programme. The system was intended to improve transparency, efficiency, and compliance with the National Building Code.

Kathmandu Metropolitan City initiated pilot implementation in 2015, followed by expansion to several municipalities including Tokha Municipality. The system allows digital submission of drawings, online communication between designers and municipal officials, and digital storage of permit records.

Municipal reports indicate that the system has reduced permit processing time and minimized the need for repeated physical office visits. However, comprehensive studies evaluating user experience remain limited.

### **2.4 Role of Designers in the Permit Workflow**

Designers play a central role in the electronic permit approval process. They are responsible for preparing architectural, structural, electrical, and plumbing drawings while ensuring compliance with building regulations.

The efficiency of the permit process depends largely on designers' ability to use the system effectively. Delays in submission, communication gaps, technical difficulties, and unclear feedback mechanisms can significantly affect workflow performance.

Modern electronic permit systems should therefore provide:

- User-friendly interfaces
- Easy document uploading systems
- Real-time notifications
- Effective communication tools
- Technical support mechanisms
- Version control systems
- Automated compliance checks

Understanding designers' perceptions is therefore essential for improving the practical effectiveness of EBPS.

## **2.5 Research Gap**

Most existing studies related to EBPS in Nepal focus on institutional implementation and technical features rather than user experiences. Limited attention has been given to designers' perceptions concerning usability, support mechanisms, efficiency, and administrative responsiveness.

Moreover, there is insufficient research specifically examining Tokha Municipality despite its active implementation of the system. This study addresses this research gap through a detailed user-centered evaluation.

## **3. RESEARCH METHODOLOGY**

### **3.1 Research Design**

This study adopted a mixed-method research approach combining quantitative and qualitative methods. The mixed-method approach was selected to achieve a comprehensive understanding of designers' experiences with EBPS.

The quantitative component involved structured questionnaires based on a five-point Likert scale, while the qualitative component consisted of focused group discussions.

### **3.2 Study Area**

The study was conducted in Tokha Municipality, located in Kathmandu Valley, Nepal. Tokha Municipality was selected because of its rapid urban growth and active implementation of the Electronic Building Permit System.

### **3.3 Study Population and Sampling**

The study population consisted of registered designers including engineers, architects, and urban planners actively using the EBPS system in Tokha Municipality.

A census approach was adopted. According to municipal records, 74 registered designers were enlisted in the municipality, and questionnaires were distributed to all registered users.

A total of 67 valid responses were received.

### **3.4 Data Collection Methods**

#### **3.4.1 Questionnaire Survey**

A structured questionnaire was developed based on established user experience frameworks and previous studies on e-government systems. The questionnaire included six categories:

- Usability & Accessibility (UA)
- System Features & Functionality (SFF)
- Information Clarity & Relevance (ICR)
- Support & Responsiveness (SR)

- Efficiency & Time Management (ETM)
- Overall Experience (OE)

A five-point Likert scale was used ranging from strongly disagree to strongly agree.

### **3.4.2 Focus Group Discussion**

Focused group discussions were conducted with designers and municipal technical officials to obtain qualitative insights regarding system challenges and improvement measures.

### **3.4.3 Secondary Data Review**

Secondary data including municipal reports, policy documents, and previous research publications were reviewed to support the analysis.

## **3.5 Data Analysis Techniques**

The collected data were analyzed using:

- Descriptive statistics
- Mean score analysis
- Cronbach's alpha reliability analysis
- Relative Importance Index (RII)
- Correlation analysis
- Thematic interpretation for qualitative data

Cronbach's alpha was used to evaluate questionnaire reliability, while RII was applied to rank system attributes according to user perception.

## **4. RESULTS AND DISCUSSION**

### **4.1 Demographic Characteristics of Respondents**

#### **Gender Distribution**

Among the 67 respondents, 86.57% were male while 13.43% were female. The higher male participation reflects the current gender composition of the engineering and construction sector in Nepal.

#### **Age Distribution**

Most respondents belonged to the 25–34 years age group (71.64%), followed by 35–44 years (26.87%). Only 1.49% belonged to the 18–24 years category. This indicates that the majority of respondents were professionally active and experienced users of the system.

### **Educational Qualification**

Approximately 73.13% of respondents possessed bachelor's degrees while 26.87% held master's degrees. This indicates a relatively high educational background among system users.

### **Experience Using EBPS**

Most respondents had used the system for one to two years (58.21%), while 20.90% had used it for more than two years. Frequent use of the system suggests that respondents possessed sufficient practical experience for meaningful evaluation.

### **4.2 Reliability Analysis**

Cronbach's alpha values were calculated to examine the internal consistency of questionnaire categories.

- Usability & Accessibility: 0.63
- System Features & Functionality: 0.64
- Information Clarity & Relevance: 0.70
- Support & Responsiveness: 0.73
- Efficiency & Time Management: 0.74
- Overall Experience: 0.82

The results indicate acceptable to good reliability for most categories. The Overall Experience category demonstrated the strongest reliability.

### **4.3 Mean Score Analysis**

#### **Very High Agreement**

Respondents expressed very high agreement regarding several system attributes:

- Easy navigation
- User-friendly interface
- Efficient task completion
- Easy document uploading
- Real-time application tracking
- Reduced office visits

These findings indicate that EBPS successfully simplifies administrative procedures and improves workflow convenience.

### **High Agreement**

Respondents also showed high agreement concerning:

- Availability of technical guidance
- Clear guidelines
- Digital form usability
- Reduced delays
- Improved project management
- System reliability

The findings suggest that designers generally consider the system operationally effective and professionally beneficial.

### **Moderate Agreement**

Moderate agreement was observed regarding regular updates of building regulations. This indicates that designers perceive gaps in the system's ability to maintain updated regulatory information.

### **4.4 Relative Importance Index (RII) Analysis**

RII analysis identified the most important features influencing user satisfaction.

#### **Highest Ranked Features**

The top-ranked attributes were:

1. Application tracking (RII = 0.899)
2. User-friendly interface (RII = 0.893)
3. Easy navigation (RII = 0.890)
4. Easy uploading of documents (RII = 0.878)
5. Efficient task completion (RII = 0.863)

These findings indicate that usability and workflow efficiency are the strongest strengths of the system.

#### **Lower Ranked Features**

The lowest-ranked attributes included:

- Up-to-date regulations (RII = 0.672)
- Timely issue resolution (RII = 0.687)
- Support for all functions (RII = 0.725)
- Municipal responsiveness (RII = 0.740)

These areas require administrative and technical improvement.

#### 4.5 Correlation Analysis

Correlation analysis revealed significant relationships among different categories.

Usability and Overall Experience

Usability & Accessibility showed moderate positive correlation with Overall Experience ( $r = 0.41$ ), indicating that user-friendly systems significantly influence satisfaction.

System Functionality and Overall Experience

System Features & Functionality demonstrated the strongest relationship with Overall Experience ( $r = 0.60$ ). This suggests that practical operational features are major determinants of positive user perception.

Information Clarity and Support

Information Clarity & Relevance showed strong correlation with Support & Responsiveness ( $r = 0.75$ ). This indicates that better support mechanisms improve information clarity.

#### 4.6 DISCUSSION

The findings indicate that Tokha Municipality's Electronic Building Permit System has substantially improved the permit approval process compared to traditional paper-based systems.

The most appreciated features involve operational convenience, particularly real-time tracking, simplified navigation, and online submission. These findings align with previous international studies indicating that digital permit systems significantly reduce administrative burden and improve user satisfaction.

The reduction in physical office visits was another important benefit highlighted by respondents. This demonstrates the effectiveness of digital systems in minimizing bureaucratic procedures and saving professional time.

However, the study also identified several institutional and technical challenges. Designers expressed dissatisfaction regarding delayed issue resolution and insufficient updating of regulations. Such issues may affect long-term confidence in the system.

Municipal responsiveness emerged as another area requiring improvement. Although digital systems improve workflow efficiency, effective administrative support remains essential for sustaining user trust.

The study therefore demonstrates that technological implementation alone is insufficient. Continuous system maintenance, administrative responsiveness, technical support, and user-oriented improvements are equally important for successful e-governance implementation.

## **5. Recommendations**

Based on the findings, the following recommendations are proposed:

### **5.1 Continuous Regulatory Updating**

Municipal authorities should establish a formal mechanism to ensure that any changes in building bylaws, regulations, and technical standards are immediately updated within the system.

Quarterly regulatory updates are recommended to maintain consistency and compliance.

### **5.2 Dedicated Technical Support Unit**

A specialized EBPS support desk should be established within the municipality. The support team should consist of personnel trained in both technical and administrative aspects of the system.

The support unit should:

- Provide immediate assistance
- Resolve technical issues promptly
- Guide designers throughout the application process
- Monitor recurring system problems

### **5.3 Performance Monitoring Framework**

Municipalities should develop measurable performance indicators including:

- Average issue-resolution time
- Query response rate
- Application processing duration
- User satisfaction level

Periodic publication of these indicators would improve transparency and accountability.

### **5.4 Capacity Building Programs**

Regular training programs should be conducted for both designers and municipal officials.

The training should include:

- Digital literacy enhancement
- System orientation programs
- Refresher training sessions

- Technical compliance workshops

Continuous capacity building is essential for long-term sustainability.

### **5.5 User Feedback Integration**

User feedback should be systematically collected through:

- Periodic surveys
- Interactive workshops
- Designer consultations
- Technical review meetings

Participatory system improvement enhances user ownership and supports practical system upgrades.

## **6. CONCLUSION**

This study evaluated designers' perceptions and experiences regarding the Electronic Building Permit System implemented in Tokha Municipality, Nepal. The findings indicate that the system has significantly improved the usability, accessibility, transparency, and efficiency of the building permit approval process.

Designers highly appreciated features such as real-time application tracking, easy navigation, online document submission, and reduction of physical office visits. These features contribute significantly to workflow simplification and professional efficiency.

Nevertheless, challenges remain concerning timely issue resolution, responsiveness of municipal authorities, and regular updating of building regulations. Such institutional and technical limitations may affect long-term system sustainability if not adequately addressed.

The study demonstrates that successful implementation of electronic governance systems requires not only technological advancement but also strong institutional support, continuous updating mechanisms, technical responsiveness, and regular capacity-building efforts.

Overall, the Electronic Building Permit System represents an important step toward modernization of municipal governance in Nepal. With continued improvement and policy support, the system has strong potential to strengthen urban governance, improve public service delivery, and support sustainable urban development.

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