

**6CS007**

UNIVERSITY PARTNER



## **PROJECT AND PROFESSIONALISM**

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## 1. Introduction

The Engineering Construction Marketplace (ECM) is a digital platform for the construction firm, material suppliers and engineering consultants to connect with different clients who want different service for construction purposes in Nepal. Unlike normal job boards or regular marketplaces, ECM specifically needs the users to submit differently uploaded documents at various steps. For instance, in a case of renting a survey instrument, the user needs to submit identification (license or citizenship), opposite to that while getting consulting of engineering in a case of building construction or submitting Lalpurja (land ownership certificate) along with appropriate blueprint maps of the site proposed. On the provider's side, they must also register with the official license number in order to be credible.

By employing this approach, both clients and firms can gain assurance on the authenticity of service providers as well as the genuineness of client projects. But with such a system of document input and data retention, there is great professional responsibility as well. The responsibilities here are on the social, ethical, legal and security aspects of software engineering. The user must believe that ECM will take proper care of their personal data and that it observes his privacy, as well as will comply with the regulations of copyright and data protection accordingly.

This report looks into how such features of ECM can potentially benefit, or otherwise, various stakeholders, what ethical principles inform how users' data is handled, legal obligations, and liabilities, as well as what measures need to be taken to secure user submitted documents. Indeed, if these concerns are addressed, ECM will be able to fulfill its promise of shaking up the inefficiency and unreliability of the Nepalese construction industry whilst maintaining professionalism.

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## 1.1 The Social Impact

The social impact of ECM involves how the platform's features, and how it prioritizes users, produce effects on wider community and social factors.

### 1.1.1 Beneficial

#### 1 Streamlined Access and verification

ECM cuts down the red tape and in person verifications that often slow down the process of starting construction projects by allowing clients to upload land tax receipts, blueprint maps, or citizenship documents online. It means that clients can spend less time and money as compared to if they had to go to several other offices to confirm their ownership or site details (Bhandari, 2022).

#### 2 Trust and Accountability

The license number on ECM must be a valid one from the construction companies while the client has to show his or her genuine IDs or land documents. One can say that it kindles trust on both sides through mutual verification. Gives companies credible project requests and clients confirmation of a firm's credentials. Such transparency discourages corrupt middleman and reduces fraud (P.Shah, 2022).

#### 3 Market Visibility for Small Business

In many places in Nepal, smaller or newer construction companies find itself unable to effectively compete against the popular companies with a proven track record. ECM's subscription tiers, user reviews, let them expose themselves in equal grounds, so as to breed healthy competition (Akerlund, 2021).

#### 4 Encouraging Formal Procedures

ECM nudges people towards formal compliance with building codes, zoning laws, tax obligations, etc. as ECM demands official property and identity proofs. Towards the end, this could lead to more organized construction practices in Nepal

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## 1.1.2 Detrimental

### 1 Digital Exclusion

However, in some Nepali regions, the internet connectivity is unreliable or people are not so literate with digital. If people are in the areas where they cannot upload large PDFs or images then they will find it difficult or impossible to do so. The other problem was this shortfall could essentially increment the distance amongst the capacity possessed urban clients and individuals from rural networks (Jithin Cheriyan, 2021).

### 2 Excessive Document Demands

Thorough checks may reduce fraud, but most prospective clients or smaller firms may be reluctant to share private documents. Thus, according to (Bhandari, 2022), if ECM requires several documents like Lalpurja, land tax papers, and 3D designs, users might find it as an invasion of their privacy, and hence, giving fewer sign-ups.

### 3 Potential Miscommunication

That might be easy for tech folks who expect users to submit ID, blueprints, or receipts, but it might confuse others who are unfamiliar with scanning or digital file submissions. If the guidelines are not explained clearly, it might result in delayed or cancelled projects due to lack of miscommunication.

### 4 Cultural Shift

Nepal's construction sector has worked by personal trust, on site visit, and informal agreements. Going too far down the path of the digital marketplace model could make people who like to deal with people instead of the web remote, and their customs that have been proven good in the small communities difficult.

## 1.2 The Ethical Issues

The issues of ethics are concerned with the moral duties that ECM carries out when dealing with user data, transaction creation, and deployment to the construction ecosystem.

### 1.2.1 Ethical Frameworks and Principles

Openness, fairness, respect for user autonomy is commonly cited ethical guidelines in software development that have been coined by (Mitchell, 2021). For ECM, these principles mean:

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- Data Augmentation: Only required to provide very specific industry personal information, rather than a complete dossier filled with irrelevant fields.
- Users must understand why they must upload specific files and what their data will be used or shared with third parties (P.Shah, 2022).

## 1.2.2 Potential Data Misuse

### 1. Unauthorized Viewing of Sensitive Files

ECM can store official ID images, land ownership certificates, and possibly the design of buildings. Any user trust to these files breezing through by internal staff or third-party integrators, the breezing would make them harmed (Bhandari, 2022).

### 2. Bias in Search Rankings

If ECM's algorithm rewards paying subscribers disproportionately, small firms unable to board the top tiers may be buried deep in search results. The ranking criteria should be disclosed ethically so as to have an even competition on the platform (Jithin Cheriyan, 2021).

### 3. Lack of Proper Disclosure

ECM may decide to partner with insurance companies, banks or any other companies to share partial users' data for promotional purposes. These behind-the-scenes deals would be ethically suspicious unless these were made without explicit user consent.

## 1.2.3 Specific Ethical Scenarios in EMC

An uploaded building design, for example, in an advanced 3D design but it may be stolen because the user doesn't have rights to the digital property and no way to claim ownership. ECM needs to be quick to respond to takedown requests and get and investigate copyright infringement claims.

Other user can submit fake property papers i.e. Fake Land Deeds. ECM cannot suppress all fraud but till such fraud occurs, it should have some kind of warnings or partial verifications.

Retrieval and Retention: ECM must give the user the capability to remove personal data and shall delete this data if requested by the user (except in cases where legal proceedings still have not been completed).



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## 1.3 The Legal Implications

The areas of law that tackle the compliance of the Data Protection Laws, copyright statutes or disclaimers limiting ECM's responsibility for fraudulent submissions, or malpractice are called the legality issues.

### 1.3.1 Data Protection Laws and GDPR

While the Nepal Personal Data Protection Bill (2022) is still evolving, it establishes rules that adhere to international standards (NepalLawCommission, 2022). Key points for ECM include:

#### 1 User Consent and Purpose Limitation

You have to have a purpose, that has to be disclosed upfront, and it has to be collecting personal or property related data. Users should not be misled on how their documents are stored or used (Bhandari, 2022).

#### 2 Secure Storage and Breach Notification

Sensitive documents must be protected with security protocols, and ECM must implement the necessary security protocols. In case of breach, the platform might have to quickly notify affected individuals or authorities.

#### 3 Account Deletion Rights

Users are granted retention freedoms under broad data protection principles: they may request that ECM delete their profile and all associated data unless retention is legally necessary. Noncompliance may contravene user privacy rights.

### 1.3.2 Copyright on Architectural or 3D Designs

Usually, construction projects involve unique 3D designs or building blueprints.

#### 1 Original vs. Generic

Assuming 3D renderings are distinctive or artistic, it will be copyright protected and hence copying it without the permission of the author, the copyright owner is an infringement (P.Shah, 2022). On the other hand, generic or code mandated designs do not have a similar protection.

#### 2 Nepali Copyright Act

Architectural works are considered as a subject of copyright under Nepal Copyright Act, 2059 (2002) and also Berne Convention. Stolen designs will even be uploaded by a user and

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the rightful owner can file infringement claims against the user. (Jithin Cheriyan, 2021) concludes that ECM should have a takedown procedure.

## 3 Use of Brand/Product Images

Legit compliance allows displaying images of cement bags, survey instruments, building materials, etc., but using logos and other official marketing images is risky by using them excessively (CyberCrimeChambers, 2022).

### 1.3.3 Verification and Liability

#### 1 Terms of Service

ECM should also indicate that it does not vouch for the authenticity of every uploaded document by a user. However, negligence claims against the platform may be made possible by repeated fraud if no verification measures exist (NepalGovernment, 2022).

#### 2 Subscription Fees and Tax Compliance

If ECM charges fees on its platform, the platform may have to get registered as a business according to local e commerce regulations for business registration, value added tax and etc. The noncompliance could involve financial or legal penalties.

## 1.4 The Security Aspects

For ECM, security is very important, because it is dealing with quite a lot of users submitted documentation. Single breach can ruin land deeds, ID scans and blueprint files and cause serious reputational damages.

### 1.4.1 Common Vulnerabilities

#### 1 Malicious File Uploads

A malicious code can be embedded in PDF or an image file. Some of the work related to ECM such as validating and possibly scanning file type before storage (Jithin Cheriyan, 2021).

#### 2 SQL Injection / XSS

Hackers in this case can retrieve sensitive data from the ECM's database or deface the site using unsensitized user inputs. Regular code reviews and scripts of the test cases help to address this (Mitchell, 2021).

## 3 Insider Threats

If an employee had strong admin privileges, he could cause the system to activate and have access or leak user documents. Detering this behavior can be done with proper logging and role-based controls.

### 1.4.2 Protective Measures

#### 1 Role-Based Access Control

Sensitive documents (like property papers), should not have extra access point to anyone other than user of that document, selected service provider, and minimum of admin staff. Auditing (Bhandari, 2022) can also be facilitated with detailed logs of each document view.

#### 2 Encryption and HTTPS

(D.Harrington, 2021) states that storing documents to be encrypted, and all transmissions go through HTTPS/TLS so as to prevent eavesdropping or theft of data in route. Also, key management is equally important to minimize misplacement or unauthorized use.

#### 3 Multi-Factor Authentication (MFA)

MFA for admin dashboard (high privilege provider account) makes stolen password risk negligible. In Stack Overflow, other platforms that were targeted by the attacks, this measure worked well.

### 1.4.3 Session Expiration and Data Deletion

Session Expiration: If a user doesn't engage in a computer at a particular period, ECM will automatically log them out to prevent improper usage of a shared or public personal computer.

ECM ensures that personal data associated with a user or firm account's deactivation is entirely erased unless a legal hold exists (NepalLawCommission, 2022). Furthermore, this feature also follows data protection standards inspired by GDPR.

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