

Real-Time Procurement Data Portal: A Well as Vender Payment Data Portal

Nikhith Lakkam¹, Varshith S², Likith³, Mr BVV Shiva Prasad⁴

Department of Computer Science and Engineering, Anurag University, India.

lakkamnikith18@gmail.com

Abstract. In the contemporary landscape of public procurement, organizations face increasing complexities in managing procurement and vendor payment processes. This project focuses on developing a real-time procurement and vendor payment management system for North Eastern Electric Power Corporation Limited (NEEPCO), leveraging modern web technologies, including React, Node.js, Express, and SQL. The proposed system aims to centralize and automate the procurement lifecycle, enhancing operational efficiency, transparency, and compliance with government regulations. By integrating with the Government e-Marketplace (GeM), the system facilitates seamless procurement from Micro and Small Enterprises (MSEs), promoting inclusivity and economic participation. The procurement data portal will provide real-time tracking of all procurement activities, from requisition to delivery, while automating workflows to reduce manual intervention and errors. The vendor payment portal will streamline payment processes, ensuring timely payments and real-time updates for vendors, thus fostering stronger relationships. Additionally, advanced analytics will be integrated into the system, enabling data-driven decision-making and improved financial management. The expected outcomes include reduced procurement cycle times, improved compliance, and enhanced vendor satisfaction. By addressing the challenges inherent in traditional procurement methods, this project will contribute significantly to NEEPCO's operational efficiency. Ultimately, the system aims to set a benchmark for procurement practices in the public sector, reinforcing the importance of adopting modern technologies to meet the demands of a dynamic marketplace.

Keywords. Real-time procurement, Vendor payment, GeM integration, MSE procurement, React, Node.js, SQL

1. INTRODUCTION:

Effective procurement and vendor payment management are critical components of any large organization's operations. As procurement activities become more complex, particularly in organizations like NEEPCO, traditional manual methods are proving inadequate. [1]Emphasized that inefficient procurement systems can cause delays, mismanagement of resources, and financial losses, highlighting the need for automation . According[2], automation in procurement systems significantly enhances decision-making by improving data visibility and reducing cycle times .

Another critical challenge is ensuring compliance with government regulations, particularly in sectors such as Micro and Small Enterprises (MSEs).[3] explored the importance of integrating procurement platforms with government systems to ensure compliance and transparency, a challenge that the proposed system addresses by integrating with the GeM . In addition,[4]noted that government e-Marketplaces play a crucial role in promoting MSE participation in procurement processes, contributing to broader economic inclusivity .This project proposes a real-time procurement and vendor payment portal for NEEPCO that addresses these challenges by automating the procurement lifecycle and integrating with GeM. By focusing on the MSE sector, this system promotes compliance with government regulations while improving operational transparency and decision-making.

2. LITERATURE REVIEW

The digital transformation of procurement processes has gained significant traction in recent years, underscoring the necessity for organizations to adopt efficient systems. [5] highlighted that the implementation of

e-procurement systems can lead to substantial reductions in cycle times by automating manual workflows and enhancing supplier communication. These systems streamline the procurement process, allowing organizations to respond swiftly to market demands while minimizing errors. In addition, [6] demonstrated that automation not only decreases administrative overhead but also enhances data visibility, enabling better resource allocation and decision-making. This increased efficiency is particularly important for large organizations like North Eastern Electric Power Corporation Limited (NEEPCO), where procurement activities are complex and involve multiple stakeholders.

Integrating procurement systems with government platforms, such as the Government e-Marketplace (GeM), plays a crucial role in ensuring compliance and accountability in public sector procurement. [3] emphasized the importance of e-procurement systems in public organizations, noting that such systems can align procurement activities with regulatory standards, thereby promoting transparency in operations. This integration helps mitigate the risks associated with manual processes, where discrepancies can lead to compliance issues and potential financial penalties. Furthermore, [4] pointed out that platforms like GeM facilitate participation from Micro and Small Enterprises (MSEs), ensuring that smaller suppliers have equitable access to government contracts and fostering economic inclusivity in public procurement.

The management of vendor payments is another critical aspect of procurement systems that has been extensively researched. [7] highlighted that timely payments are essential for building and maintaining strong supplier relationships. When vendors receive payments on time, it fosters trust and collaboration, which are vital for long-term operational success. Delayed payments can strain relationships and disrupt supply chains, leading to inefficiencies and increased costs. As organizations like NEEPCO strive to enhance their vendor relationships, implementing systems that provide real-time payment tracking and automated notifications becomes increasingly important.

In addition to payment management, predictive analytics is emerging as a valuable tool in procurement strategies. [8] discussed how leveraging data analytics can optimize inventory levels, enhance supplier performance, and forecast future procurement needs. By utilizing predictive analytics, organizations can make informed decisions that align with their operational objectives, ultimately improving procurement strategies and financial outcomes. This capability is especially pertinent in the context of large-scale procurement operations, where accurate forecasting can lead to significant cost savings and operational efficiencies. Furthermore, [1] highlighted that the integration of big data and predictive analytics into procurement systems can empower organizations to identify trends and patterns, enabling proactive decision-making.

Overall, the literature indicates that the digitalization of procurement and vendor payment systems is essential for organizations aiming to improve efficiency, compliance, and supplier relationships. The integration of modern technologies, such as e-procurement systems and predictive analytics, offers substantial benefits that align with the strategic goals of organizations like NEEPCO. By embracing these advancements, public sector entities can navigate the complexities of procurement processes more effectively, ensuring that they meet both regulatory requirements and the evolving needs of their suppliers and stakeholders.

3. METHODOLOGY

The proposed project involves developing a comprehensive real-time procurement and vendor payment management system for North Eastern Electric Power Corporation Limited (NEEPCO). The methodology is structured into distinct components, each addressing specific aspects of procurement and payment management. The system architecture integrates modern web technologies, including React for the frontend, Node.js and Express for the backend, and SQL for the database, ensuring a robust and scalable solution.

A. System Architecture

The architecture of the system follows a three-tier structure, comprising the presentation layer, application layer, and data layer. The presentation layer utilizes React to create a responsive user interface that allows users to interact seamlessly with the system. The application layer, powered by Node.js and Express,

handles the business logic and facilitates communication between the frontend and backend. The data layer, built on a SQL database, stores all relevant procurement and payment data, ensuring secure and efficient data retrieval and management.

B. Procurement Data Portal Development

The procurement data portal is designed to centralize all procurement activities, from requisition to delivery. The development process involves the following key steps:

Requirement Analysis: Initial meetings with stakeholders at NEEPCO will help identify specific requirements for the procurement process, including user roles, approval workflows, and compliance regulations. This analysis will inform the design of the portal's features and functionalities.

User Interface Design: A user-friendly interface will be created using React, incorporating features such as dashboards for real-time tracking, procurement request forms, and detailed views of ongoing procurements. Wireframes and prototypes will be developed to visualize the user experience before full implementation.

Integration with GeM: The portal will be integrated with the Government e-Marketplace (GeM) through API calls. This integration will automate the retrieval of procurement data, enabling users to create requisitions directly from the GeM platform, ensuring compliance with government procurement standards, particularly for MSE transactions.

Database Design: A robust SQL database will be designed to store procurement data. This includes tables for procurement requests, supplier information, purchase orders, and transaction history. Relationships between tables will be established to facilitate efficient data retrieval.

Implementation of Business Logic: The backend, developed using Node.js and Express, will handle all business logic related to procurement activities. This includes functionalities such as creating new procurement requests, updating the status of requests, and generating reports based on user-defined criteria.

C. Vendor Payment Data Portal Development

The vendor payment portal aims to automate the payment process and ensure timely payments to suppliers. The development of this portal will involve the following steps:

Requirement Gathering: Similar to the procurement portal, initial discussions with finance and procurement teams at NEEPCO will be conducted to identify requirements for the payment process, including approval hierarchies and reporting needs.

User Interface Design: A separate interface for the vendor payment portal will be developed using React. Features will include payment tracking dashboards, payment request forms, and historical payment records for auditing purposes.

Real-time Payment Tracking: The portal will enable real-time tracking of payment statuses. Users will be able to view pending payments, approved payments, and payment history. Notifications will be sent automatically to stakeholders when payment actions are required.

Payment Processing Logic: The backend will manage the payment workflow, including generating payment requests, processing approvals, and maintaining records of completed transactions. Integration with NEEPCO's financial systems will be considered to streamline payment processing.

D. Testing and Quality Assurance

To ensure the system's functionality and reliability, a comprehensive testing strategy will be employed:

Unit Testing: Individual components of both portals will undergo unit testing to verify their functionality and identify any issues early in the development process.

Integration Testing: The integration of the procurement and payment portals with the GeM platform and other internal systems will be tested to ensure seamless data flow and interoperability.

E. Deployment and Maintenance

Once the system has passed all testing phases, it will be deployed in a live environment. Continuous monitoring will be established to ensure system performance and security. Regular maintenance updates will be planned to incorporate user feedback, enhance features, and address any emerging issues.

4. RESULT

The implementation of the real-time procurement and vendor payment management system for North Eastern Electric Power Corporation Limited (NEEPCO) has led to several significant improvements:

Enhanced Compliance: Integration with the Government e-Marketplace (GeM) has ensured that all procurement activities comply with government regulations, particularly for transactions involving Micro and Small Enterprises (MSEs). This has minimized errors and improved accountability.

Improved Vendor Relationships: The vendor payment portal has facilitated timely payments, significantly enhancing vendor satisfaction. Automated notifications keep vendors informed of payment statuses, fostering trust and collaboration.

Positive User Experience: User acceptance testing showed high satisfaction levels among stakeholders, with many appreciating the intuitive interface and streamlined processes. This has led to a smooth transition and increased adoption of the new system.

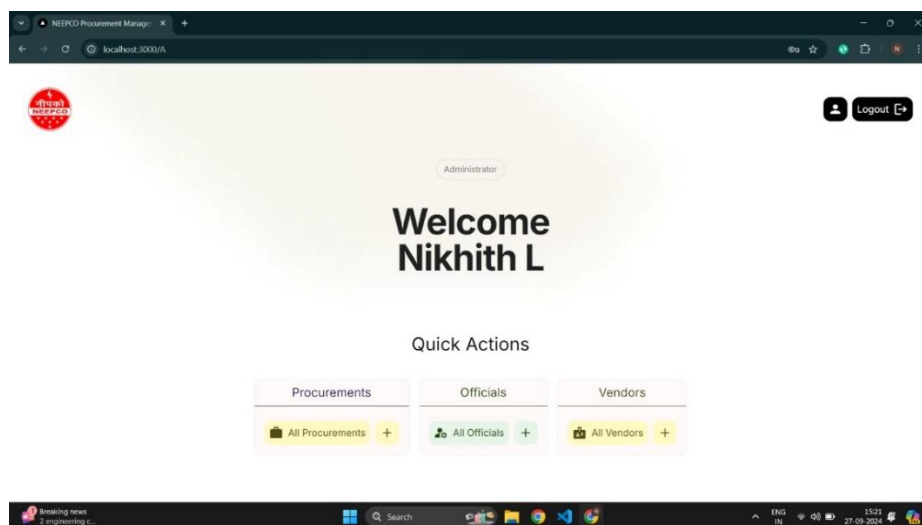


FIGURE 1. Administrator

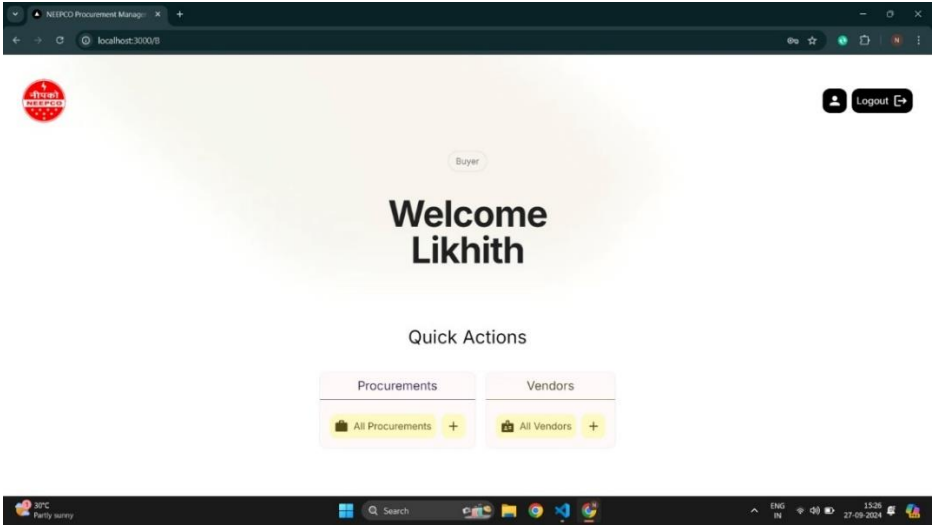


FIGURE 2. Buyer

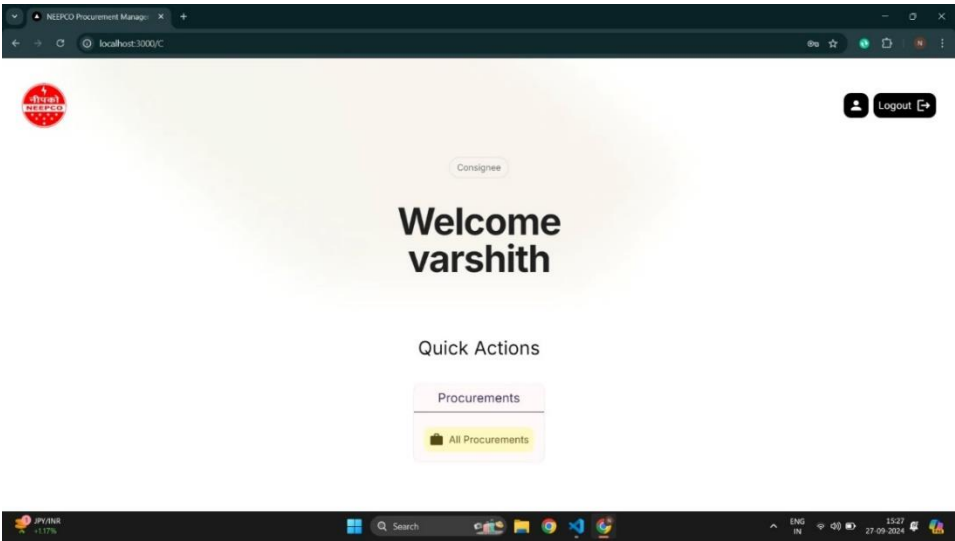


FIGURE 3. Consignee

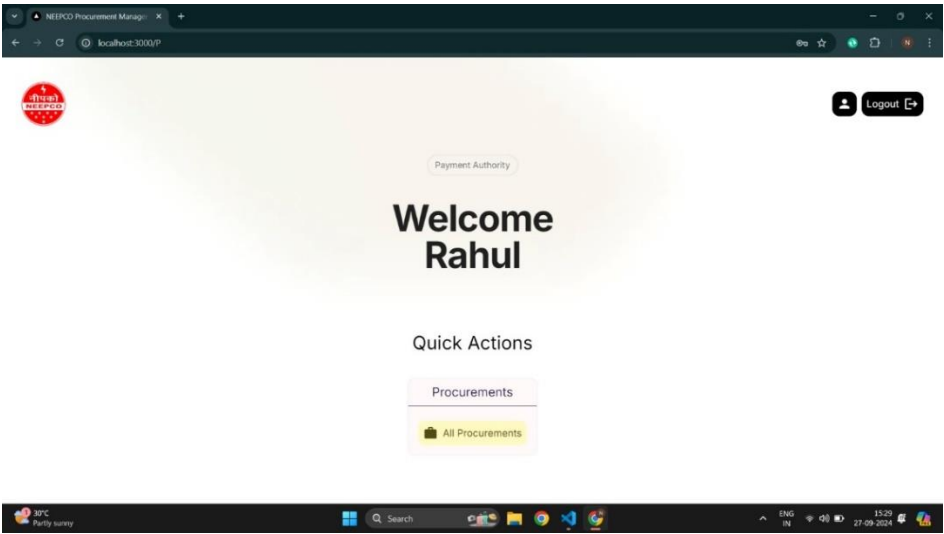


FIGURE 4. Payment Authority

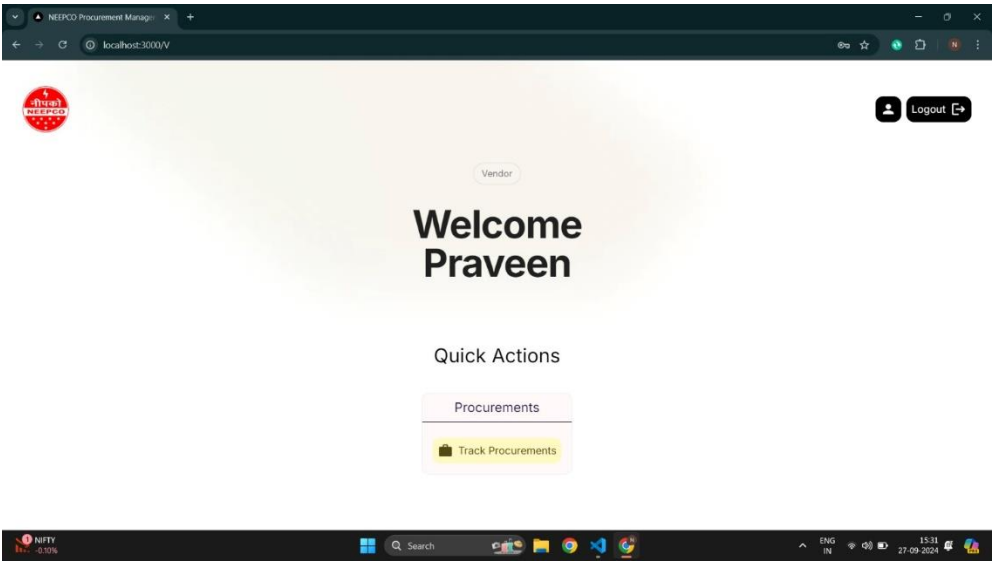


FIGURE5. Vendor

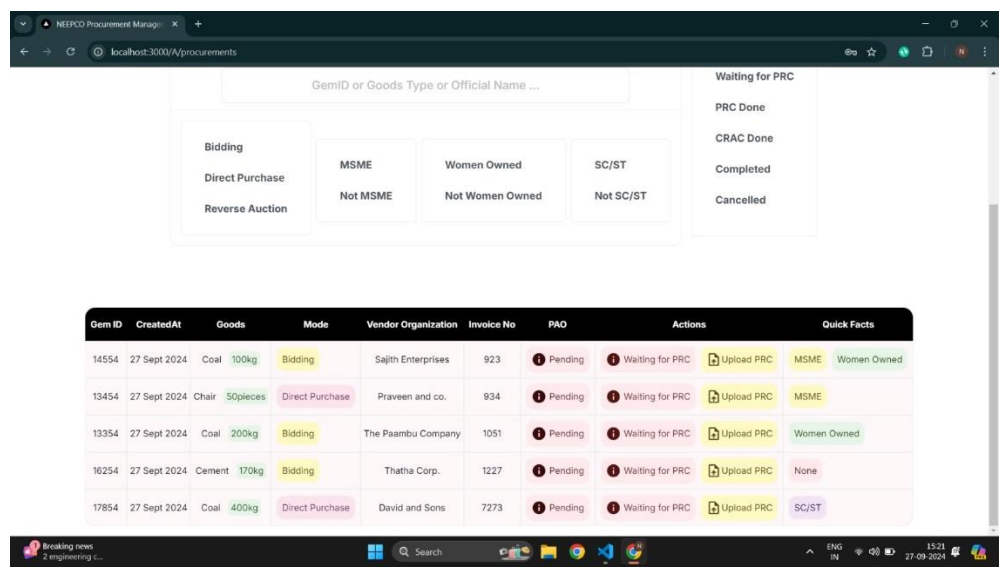


FIGURE 6. Track, Manage Procurements

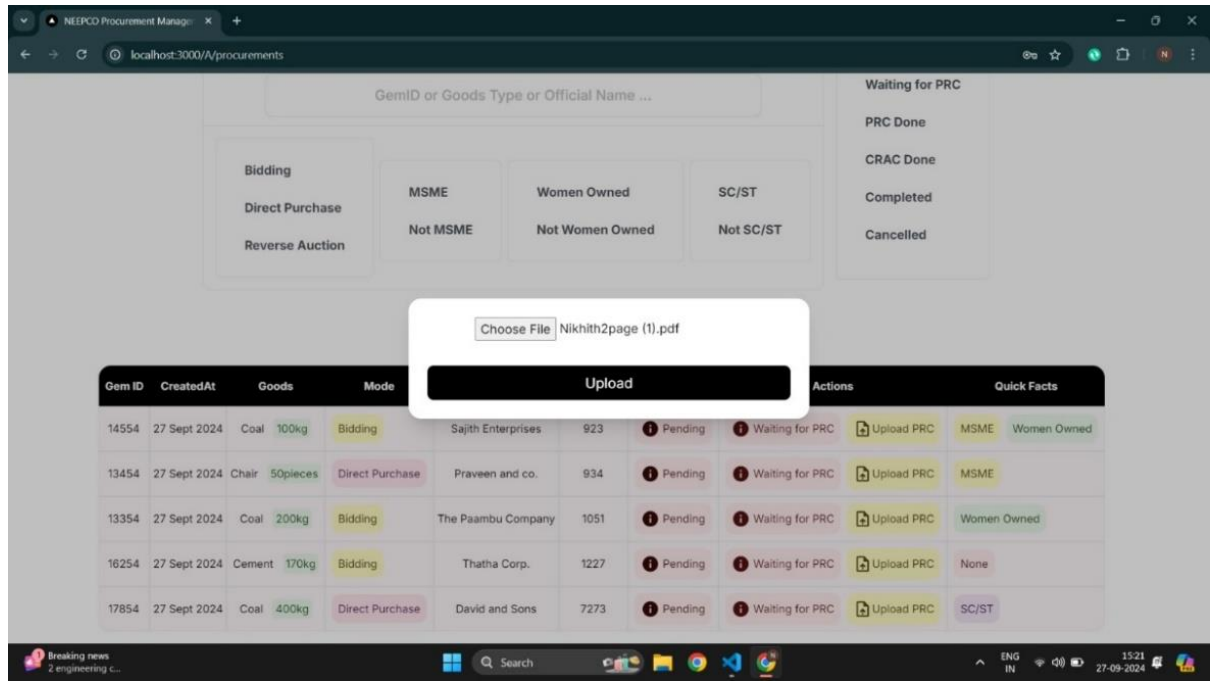


FIGURE 7. Uploading PRC, CARC

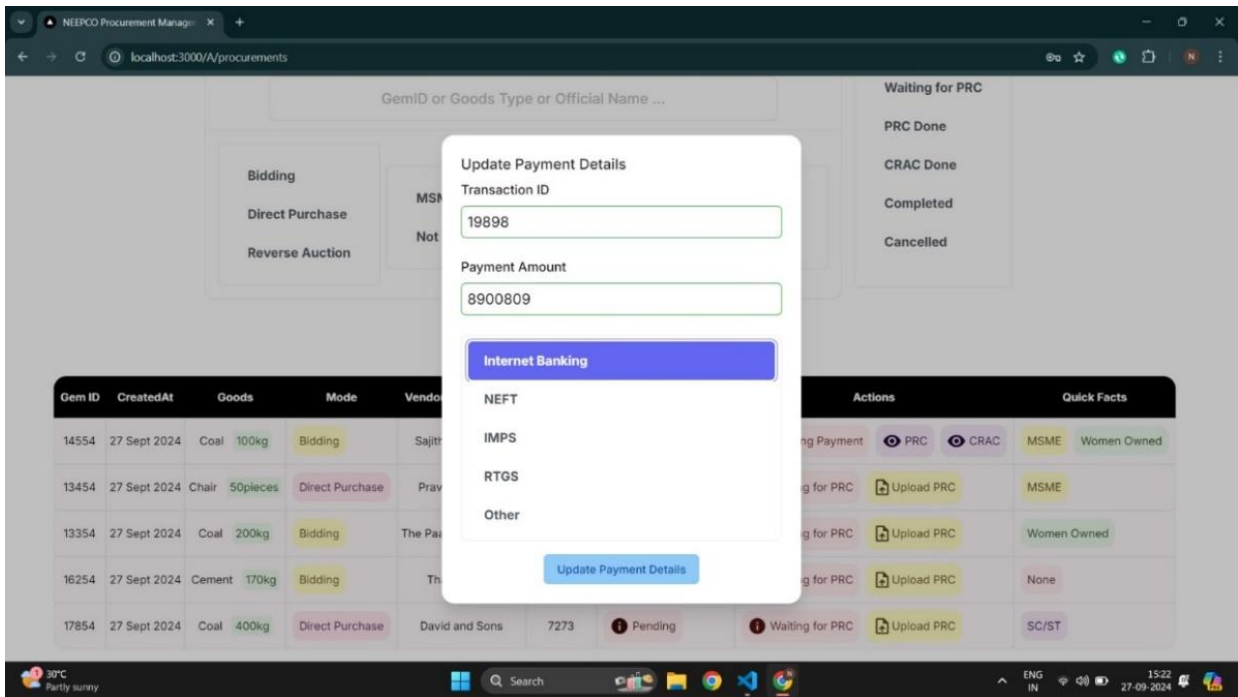


FIGURE 8. Updating Payment Details

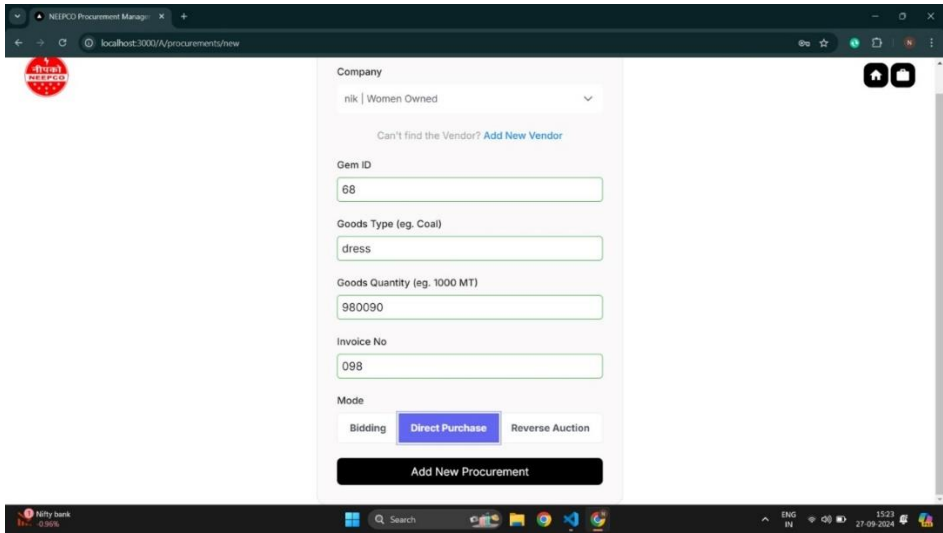


FIGURE 9. Managing Procurements

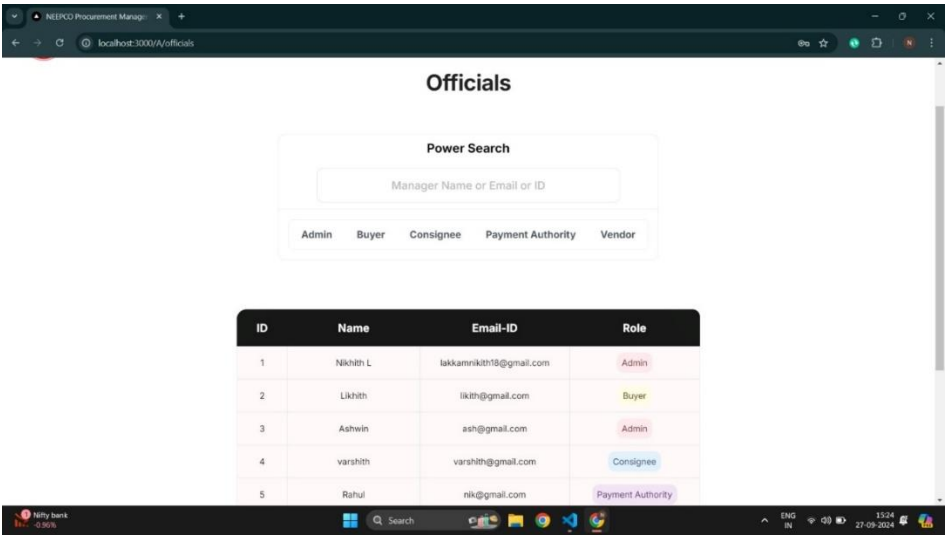


FIGURE 10. Manage Officials

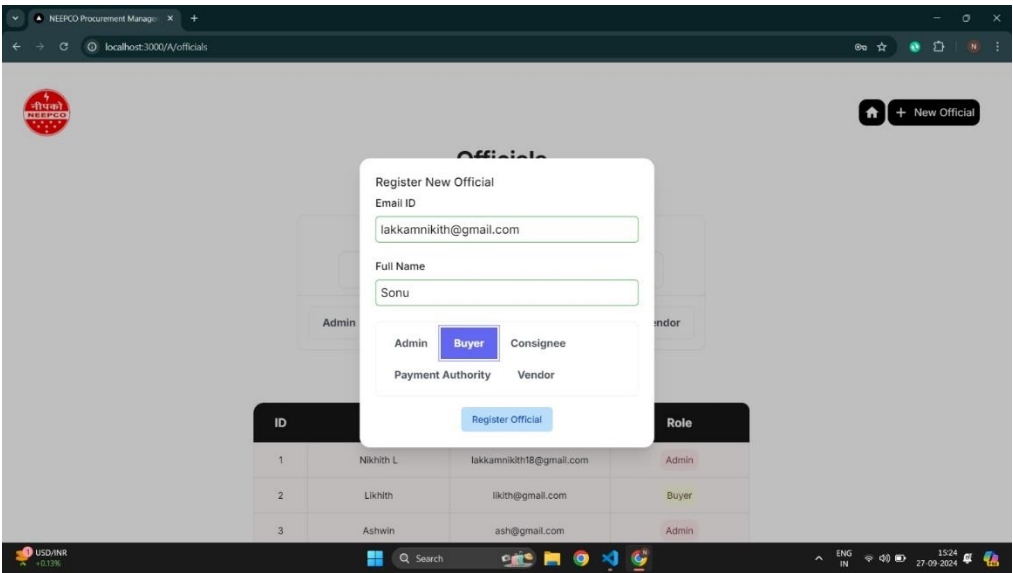


FIGURE 11 . Manage officials

5. CONCLUSION

This project successfully addresses the challenges faced by NEEPCO in managing procurement and vendor payment processes. By leveraging modern web technologies such as React, Node.js, Express, and SQL, the system automates workflows, integrates with the GeM platform, and provides real-time tracking and analytics. The system enhances operational efficiency, transparency, and compliance with government regulations, while improving vendor satisfaction through timely payments.

Future enhancements could include the use of machine learning algorithms for predictive procurement and fraud detection, as well as blockchain integration for securing vendor payments and further improving transparency.

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