International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 09 Issue: 04 | April - 2025 SJIF Rating: 8.586 ISSN: 2582-3930

Web Based Procurement Management System

Akash R, Bachelor of Technology in CSE, NCERC
Angel G, Bachelor of Technology in CSE, NCERC
Anirudh S, Bachelor of Technology in CSE, NCERC
Archana M, Bachelor of Technology in CSE, NCERC
Mrs.Soumya T, Assisstant Professor,Department of CSE,NCERC

1.Abstract

Efficient procurement is crucial for successfully managing multiple projects. This system simplifies the procurement process by enabling smooth coordination among all stakeholders—administrators, procurement engineers, and site engineers. It supports effective product management, optimizes costs, and ensures transparency and accuracy throughout the procurement lifecycle. The Admin Panel oversees the entire workflow, handling vendor interactions and managing approval processes. The Procurement Engineer Panel is responsible for product selection, cost evaluation, and order management, ensuring that materials are delivered on time. The Site Engineer Panel focuses on meeting project-specific needs, monitoring material usage, and providing real-time updates from the site. By integrating these components, the system significantly improves project management efficiency, minimizes delays, and enhances overall customer satisfaction.

2 .INTRODUCTION

In today's dynamic business landscape, efficient procurement management is vital for organizations handling multiple projects. Traditional procurement methods, often reliant on manual processes, can lead to inefficiencies, delays, and increased costs. Addressing these challenges, the Procurement Management System (PMS) offers an innovative, streamlined approach to managing procurement activities with greater transparency, efficiency, and cost effectiveness. At its core, PMS acts as a centralized platform that automates the entire procurement workflow—from requisition to order fulfillment. With role-based access control, the system ensures that all activities are carried out in a structured, secure, and accountable manner. It eliminates the need for manual paperwork and lengthy approvals, enabling organizations to manage procurement with minimal effort and maximum efficiency. More than just an automation tool, PMS is a comprehensive procurement solution. It enhances vendor selection, reduces unnecessary expenditures, and fosters effective collaboration among key stakeholders.

By facilitating real-time communication between administrators, procurement engineers, and site engineers, PMS ensures seamless coordination and the timely procurement of high-quality materials at competitive prices— aligned with project requirements. Key Panels of PMS Admin Panel: Manages vendor databases, adds or removes vendors, and sets login credentials for users. Site Engineer Panel: Submits procurement requisitions, visits project sites, and uploads site-specific and customer-specific requirements. Procurement Engineer Panel: Handles vendor relationships, selects vendors, and generates or downloads purchase orders in PDF format. One of PMS's key strengths is its integrated procurement request and approval system. With just a few clicks, site engineers can submit procurement requisitions, while procurement engineers process these requests rapidly—ensuring an uninterrupted workflow and reducing delays. This automation saves valuable time and guarantees that materials are acquired efficiently, preventing disruptions in project timelines.PMS not only prioritizes a user-friendly experience with its intuitive interface but also enhances procurement transparency by securely archiving purchase order details and vendor transactions. This secure storage ensures regulatory compliance, prevents data loss, and supports informed decision-making for future purchases. Additionally, the system features real-time tracking and automated documentation, which streamline the procurement process, reduce bottlenecks, optimize spending, and foster smooth coordination among all procurement stakeholders. In summary, the Procurement Management System (PMS) boosts efficiency, transparency, and security throughout procurement operations. By simplifying vendor management, purchase order creation, and document handling, PMS minimizes errors and data loss while improving collaboration between administrators, procurement engineers, and site engineers. Future enhancements—such as AI-driven decision making, financial integration, live tracking, and automated

inventory management— promise to further optimize operations, reduce costs, and elevate overall project management, ultimately leading to increased productivity and improved customer satisfaction.

3. LITERATURE SURVEY

3.1 Procurement Management Information System Research and Implementation Based on ASP.NET
Author: Guo Jun-wei
Focus: Discusses the need for a procurement management system to improve efficiency in enterprises. Proposes a system using ASP.NET with database integration to automate purchase orders, approvals, and supplier management
.

3.2 The Development of Procurement Management Information System Based on Workflow Technology
Author: Xiaoping Qiu et al.
Focus: Uses workflow technology to make procurement processes more flexible and adaptable. The system allows dynamic changes to procurement steps without rebuilding the entire software
.

3.3 An Innovative Method of Procurement Management in the Electronics Industry
Author: Maksim A. Agarkov et al.
Focus: Proposes a mathematical model to optimize procurement in the electronics industry. The model uses differential equations to determine the ideal procurement volume and reduce inventory costs

4. Technolgy used in Procurement Management System

Software used:
Vs Code: A free, open-source code editor made by Microsoft, used by developers to write, edit and manage code for various programming languages and projects.
Node.js is an open-source, cross-platform JavaScript runtime built on Chrome's V8 JavaScript engine. It lets you run JavaScript outside the browser, like on a server on your computer.
Package used in Node. Js:
Axios: Axios is a popular JavaScript library used to make HTTP requests (like GET, POST, PUT, DELETE) from your frontend app (like React) to a backend or an API.
React Router DOM: It is a routing library for React that lets you create navigation between different pages or components in our app without reloading the whole page.
React Bootstrap
jsPDF: It is a popular JavaScript library that lets us generate PDF files directly from our browser or frontend JavaScript code without any server.
React Toastify: It is a React library that helps us easily show toast notifications or small popup messages that alert users about success, errors, warnings or other events.
JSON Server: JSON Server is a fake REST API we can create quickly using a simple JSON file. It is mainly used for mocking backend APIs during frontend development.

5. Proposed System

Improvements Over the Existing System:

- AI Feature Integration
- Smart Order Delay Detection to automatically track delayed orders.
- AI-driven suggestions for alternate vendors when delays occur.
- Enhanced Tracking & Notifications
- Automated reminders for purchase deadlines to avoid delays.
- Live status updates on procurement progress.
- Multi-Panel Role Management

Unlike the existing system our system includes four roles:

1. Admin Panel: Manages users, vendors, and system security.
2. Procurement Engineer Panel: Handles vendor selection and purchase orders.
3. Manager Panel: Approves and monitors procurement activities.
4. Site Engineer Panel: Raises requisitions and manages received goods.

Improved UI & Data Management
More structured database for tracking purchase history.
Easier access to vendor and product details for all stakeholders

6. Challenges Faced During Implementation:

User Role-Based Access Management
Define access levels for Admin, Engineers, and Managers. Limit access to relevant sections only.

Authentication & Security
Secure login for Engineers with password encryption and unauthorized access prevention.

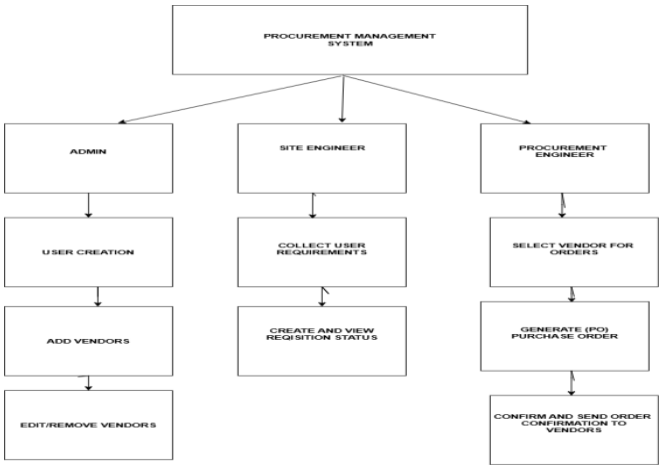
Real-Time Data Sync
Sync procurement, orders, and inventory across roles to avoid data conflicts.

Error Handling & Debugging
Fix bugs in auth, DB queries, and APIs. Maintain logs to track issues.

Deployment & Maintenance
Smooth deployment, handle downtimes, and set up backups to avoid data loss.

7. System Design

7.1. Architechture of the System



7.2Module include:

Admin Pannel
Manage Vendor Details
Add /Remove Vendors
Set login credentials
User creation

Site Engineer
Raise procurement requisition
Visit project sites
Upload customers & site specific requirements.

Procurement Manager
Manage Vendor Relationship
Select vendors
Create and download purchase order (invoice) as pdf.

8. Implementation and Results

8.1 System Development

The Procurement Management System was developed as a web-based application using modern front-end and back-end technologies. The primary aim was to digitize and streamline procurement tasks like managing vendors, products, and purchase orders. The system comprises the following modules:
Vendor Module:
Users can add new vendors and view existing vendor details.
Ensures centralized vendor data management. Product Module:
Allows entry and updating of product details.
Connects products to corresponding vendors.
Purchase Order Module:
Users can create purchase orders by selecting vendors and products.
Auto-calculates quantities and total cost. Enables viewing of existing orders and their statuses.
PDF Generation:
Purchase orders can be exported as PDF files using the jsPDF library.
Notifications:
Uses Toastify to show success, error, or warning messages during operations.
Routing:
React Router DOM enables smooth navigation between pages without reloading the whole app. The user interface was built using ReactJS along with Bootstrap and React Bootstrap for responsive layouts. For backend simulation during development, JSON Server was used as a fake REST API. The development was done in VS Code using Node.js for package and script handling.

8.2 System Testing

To ensure reliability and correctness of the system, the following testing strategies were employed:
Unit Testing:
Individual React components such as forms and buttons were tested.
Validation logic for forms was verified.
Integration Testing:
Combined testing of form submission with Axios requests and database (mocked via JSON Server). Verified seamless navigation across modules.
User Acceptance Testing:
Final testing was done by a group of target users.
Issues like form field alignment, validation alerts, and toast message timing were resolved based on feedback.

Results:
The system responded well under test conditions.
Purchase orders were created and displayed correctly.
PDF export and notifications worked as expected.
Let me know if you want this as a DOCX or formatted LaTeX version for direct submission. I can also add labeled screenshots and figure captions if needed.

8.3 Results:

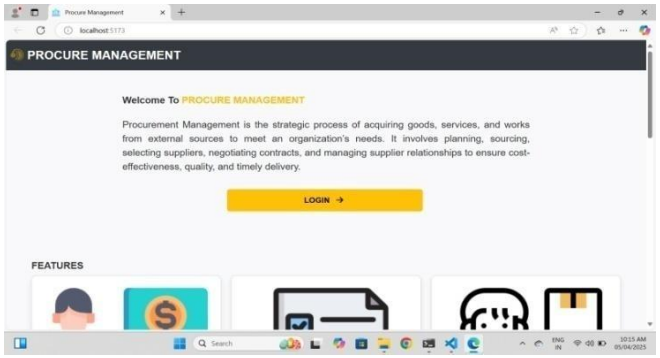


Fig 1. Home Page

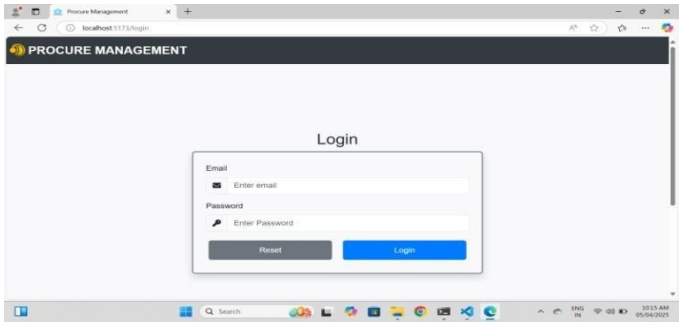


Fig 2. Login Page

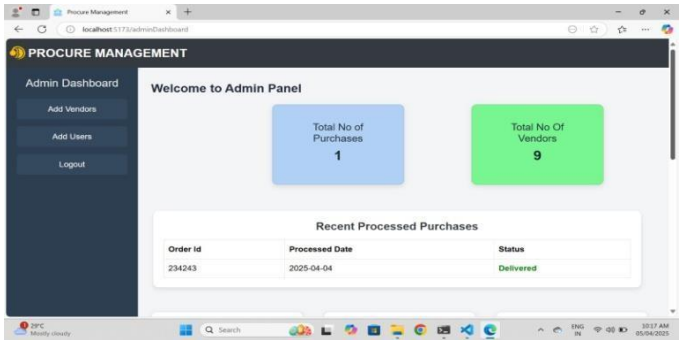


Fig 3. Admin Dashboard

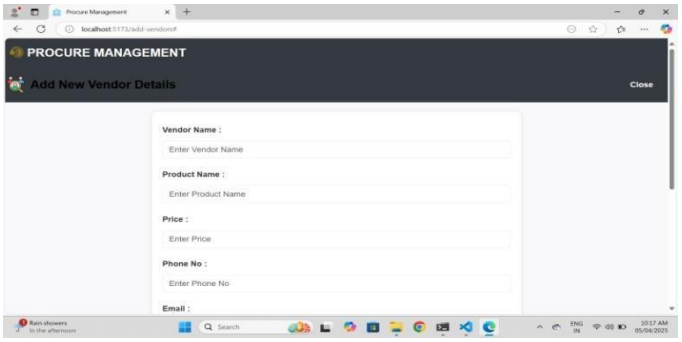


Fig 4. Add Vendors

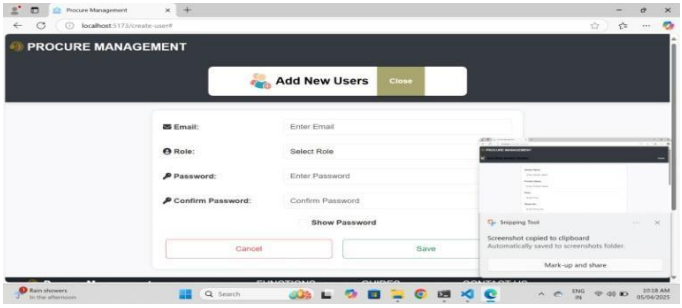


Fig 5. User Creation

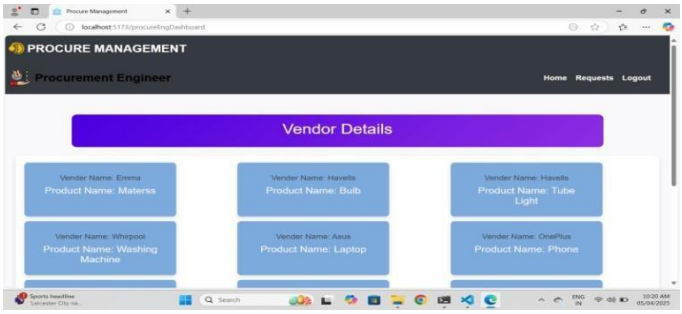


Fig 6. Procurment Engineer Dashboard

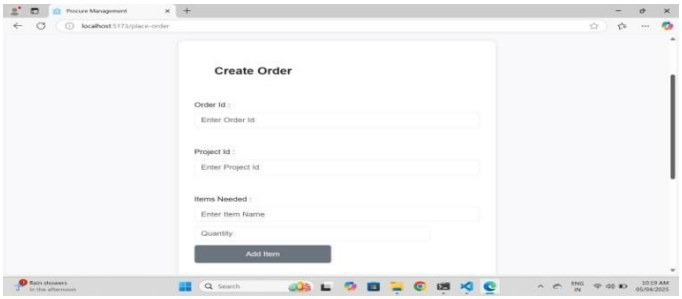


Fig 7. Create Order Page

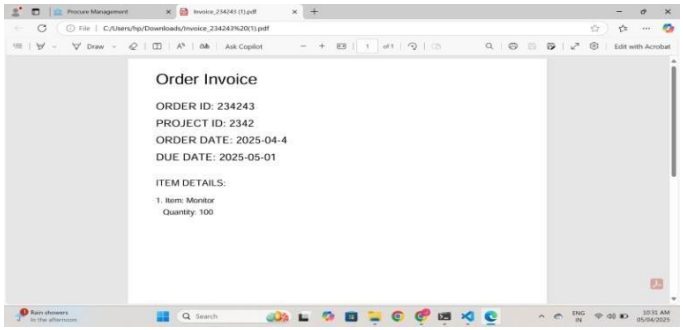


Fig 8. Purchase Order Pdf

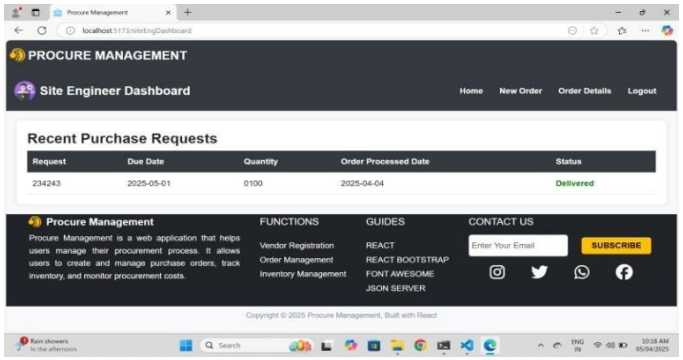


Fig 9. Site Engineer Dashboard

9. DISCUSSION AND ANALYSIS

9.1 Advantages of Procurement Management System:

- User-friendly UI using React and Bootstrap for smooth navigation.
- Faster development with reusable components and modern tools.
- Easy data handling using Axios and JSON Server.
- Clear routing between pages with React Router DOM.
- Instant alerts using Toastify for better user communication.
- PDF generation for records via jsPDF integration.
- Future scalability with planned backend and secure deployment

9.2 Future work:

- Future Scope:
- AI & ML
- Automated Order Processing
- Advanced Analytics
- Enhanced UX
- Block chain
- IoT Inventory
- Mobile & Cloud
- Mobile App Development

10. ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my Mentor Mrs. Soumya T for their invaluable guidance, encouragement, and continuous support throughout the development of this project. Their expertise and insightful feedback played a crucial role in enhancing my understanding and improving the project's quality. I extend my heartfelt thanks to my team members for their dedication, teamwork, and commitment, which were instrumental in successfully implementing the Procurement Management System. Their contributions in various aspects of design, development, and testing greatly enriched the project. I am also thankful to Nehru College of Engineering and Research Centre, Thiruvillamala for providing the necessary resources and a conducive learning environment, enabling me to explore and apply my technical knowledge effectively. Finally, I deeply appreciate the unwavering support and encouragement from my family and friends, whose motivation kept me inspired through out this journey. This project has been a significant learning experience, and I am truly grateful to everyone who contributed to its successful completion.

11. CONCLUSION

The proposed Procurement Management System (PMS) provides a structured and efficient solution for managing procurement activities within organizations. By enhancing efficiency, transparency, and security, the system streamlines vendor management, purchase order creation, and document handling—ensuring a smooth and reliable procurement process.Through role-based access, PMS improves coordination among administrators, proc urement engineers, managers, and site engineers. This leads to faster approvals, accurate purchase tracking, and organized data management.

The system also supports compliance with procurement policies and maintains a comprehensive record of all transactions, effectively eliminating inefficiencies.By minimizing delays, optim management, PMS enhances resource utiizing workflows, and improving project lization and boosts overall productivity. Furthermore, it strengthens supplier relationships and contributes to a more streamlined, responsive, and effective procurement environment. Ultimately, PMS empowers organizations with better coordination, faster execution, and higher customer satisfaction, positioning it as a vital tool for modern procurement operations.

12. REFERENCES

1. "Transparency in Public Procurement Processes – A Case Study of a Swedish Public Procurement Process in the Consultancy Market" Auth or: Karolin Knutsen-Öy

2. "A Procurement Data Standard Tool for State Universities and Colleges" Auth ors: Floradel S. Relucio, Josephine S. Dela Cruz

3. "Unified Modeling and Framework Design on Procurement Data Standards Implementation" Auth or: Floradel S. Relucio

4. "Procurement Systems: A Cross-Industry Project Management Perspective" Author: Not specified in the available information. Source: ResearchGate

5. "Critical Review of Procurement Method Research in Construction Journals" Authors: Not specified in the available information. Source: ScienceDirect