

# Cross-platform application for Major Project Management and tracking

## Aditya Nirmal<sup>1</sup>, Omkar Patil<sup>2</sup>, Pranoti Namdas<sup>3</sup>, Yash Patil<sup>4</sup>, Vrushali Paithankar<sup>5</sup>

Department of Computer Engineering, Shrimati Kashibai Navale College of Engineering, Pune, India<sup>1</sup>

Department of Computer Engineering, Shrimati Kashibai Navale College of Engineering, Pune, India<sup>2</sup>

Department of Computer Engineering, Shrimati Kashibai Navale College of Engineering, Pune, India<sup>3</sup>

Department of Computer Engineering, Shrimati Kashibai Navale College of Engineering, Pune, India<sup>4</sup>

Department of Computer Engineering, Shrimati Kashibai Navale College of Engineering, Pune, India<sup>5</sup>

**Abstract:** Conventional management tools frequently fail to provide real-time responsiveness, effective resource allocation, and seamless cross-platform support in the context of large-scale project execution. A Cross-Platform Application for Major Project Management and Tracking, created with Flutter, is presented in this paper as a comprehensive solution that guarantees device-agnostic access on desktops, tablets, and smartphones. The system solves important issues with current platforms, such as platform dependency, disjointed team communication, and inefficient task monitoring. The suggested approach uses a hierarchical task delegation model in which project managers give leads tasks to complete and then divide those tasks into smaller, deadline-driven tasks. Team members are always informed thanks to Firebase's real-time updates and notifications, which cut down on misunderstandings and delays. Better tracking of project milestones and the identification of workflow bottlenecks are made possible by the application's sophisticated data visualizations and user-friendly interface.

The system maximizes resource utilization, facilitates well-informed decision-making, and improves project workflow transparency through integrated analytics and stringent data security procedures. In order to establish this cross-platform tool as a scalable, effective, and safe substitute for traditional project management services in contemporary, fast-paced settings, this study examines its conception, deployment, and expected effects.

**Keywords:** Flutter Development, Firebase, Cloud, SQL lite, Operations Management, Real-Time Collaboration, Database, Resource Allocation, Team Communication.

## I. INTRODUCTION

Effective project management has emerged as a crucial factor in determining an organization's success in the fast-paced, cutthroat business world of today. The difficulties are numerous, especially in large-scale projects; they include the intricacy of the tasks, the participation of several teams, and the pressure of meeting deadlines. These issues are frequently not adequately addressed by the project management tools currently in use, which leads to inefficiencies, communication breakdowns, and postponed project deliveries. These shortcomings underscore the pressing need for a cutting-edge, adaptable, and reliable solution that facilitates more efficient task distribution, real-time monitoring, and productive teamwork. Inadequate communication channels, poor resource management, and limited support for realtime updates are common problems with traditional project tools. Due to these restrictions, there is a lack of transparency, faulty reporting systems, and manual task distribution, all of which lead to missed deadlines and overspending. Additionally, a lot of these tools are platform-specific, which limits team collaboration in a multi-platform setting and restricts access across multiple devices. We suggest a Cross-Platform Application for Major Project Management and Tracking in order to address these issues. The application, which was created with Flutter, guarantees smooth operation on PCs, tablets, and smartphones, giving users a consistent experience on all of them. Regardless of a stakeholder's location or preferred device, this cross-platform compatibility greatly increases productivity and permits ongoing collaboration A hierarchical task management system serves as the foundation for the application's workflow. According to this model, team leads are given high-level tasks by the project manager, who then break them down into more manageable, smaller tasks that are then given to team members. Clear responsibilities are ensured by the welldefined priorities and deadlines for each task. A proactive work environment is promoted by real-time status updates, deadline alerts, and dependency tracking, which help team members remain coordinated and in sync. The suggested solution's adaptability is one of its main advantages. The application enables all stakeholders to contribute from a variety of platforms because it is not restricted to any particular operating system. In addition to encouraging a more cohesive workplace culture, this flexibility speeds up decision-making and improves workflow continuity in general.



#### Impact Factor 8.102 $\,\,st\,$ Peer-reviewed & Refereed journal $\,\,st\,$ Vol. 14, Issue 4, April 2025

#### DOI: 10.17148/IJARCCE.2025.14472

The application also has sophisticated visualization tools and an easy-to-use interface. These tools facilitate the creation of thorough analytical reports, the tracking of project milestones, and the identification of bottlenecks. Managers are empowered to make well-informed, data-driven decisions by the actionable insights that integrated analytics provide into team performance, resource allocation, and project timelines. Additionally, the need for external platforms is reduced by integrating communication tools directly into the app, centralizing all project-related conversations and documentation in a safe location.

A key component of the suggested system is data security. Ensuring confidentiality and integrity throughout the project lifecycle, the application uses strong protection mechanisms to prevent unauthorized access to sensitive project data.

To sum up, our Cross-Platform Application for Major Project Management and Tracking has the potential to revolutionize the planning, execution, and monitoring of large-scale projects. The solution overcomes the significant drawbacks of conventional project management tools by emphasizing cross-platform accessibility, real-time collaboration, hierarchical task delegation, and integrated analytics. It provides a thorough, adaptable, and effective framework that is suited to the changing requirements of contemporary businesses and educational institutions.

#### (A) Cross-Platform Software Development

Software development has become a cornerstone of contemporary life, shaping the ways we communicate, work, learn, and access various services. This field involves the design, implementation, testing, and maintenance of software systems that serve a diverse array of applications, from enterprise solutions to mobile apps and embedded systems. As the demand for software continues to rise across different sectors, the techniques and technologies used in software development are also evolving. One of the most significant trends in recent years is the growing popularity of cross-platform development, which allows applications to function smoothly across multiple operating systems.

In the past, developers typically used native tools tailored to each platform—like Java or Kotlin for Android, Swift or Objective-C for iOS, and C# for Windows. While native development can deliver outstanding performance and direct access to platform-specific features, it often necessitates maintaining separate codebases for each platform. This can lead to increased development time, higher costs, and added complexity, particularly when applications need to be updated or scaled quickly.

To tackle these challenges, cross-platform development frameworks have emerged as effective alternatives. These frameworks enable developers to write a single codebase that can be deployed across various platforms, ensuring a consistent user experience and functionality. Well-known cross-platform frameworks like Flutter (from Google), React Native (from Meta), and Xamarin (from Microsoft) offer tools, libraries, and components that streamline development and enhance performance across different platforms.

For instance, Flutter utilizes the Dart programming language and allows developers to create visually appealing and responsive user interfaces through its widget-based structure. React Native, on the other hand, is built on JavaScript and allows for the integration of native modules when needed, making it a great choice for applications that require both web and mobile versions. Xamarin employs C# and .NET, enabling developers to share business logic across platforms while still having access to native APIs.

From a software engineering perspective, cross-platform development aligns with several key principles of modern development practices. It encourages code reusability, modularity, and portability, which can enhance development efficiency and reduce the chances of bugs that arise from duplicated code across platforms. Additionally, it supports agile methodologies, allowing for quicker iteration cycles and smoother integration with DevOps processes. This adaptability is particularly beneficial in environments where rapid prototyping and continuous delivery are essential for business success.

Moreover, cross-platform development fosters better collaboration among development teams. With a unified codebase, front-end and back-end teams can work more closely together, and quality assurance teams can streamline their testing processes across different platforms. The tools integrated within these frameworks also facilitate unit testing, UI testing, and debugging across various operating systems, ultimately improving the overall quality of the software.

However, it's important to note that cross-platform development isn't a universal solution. Developers and organizations must weigh the trade-offs involved. For performance-sensitive applications—like games or those requiring real-time hardware interaction (such as augmented or virtual reality)—native development may be more advantageous due to its closer integration with platform APIs and hardware acceleration.



#### Impact Factor 8.102 $\,\,st\,$ Peer-reviewed & Refereed journal $\,\,st\,$ Vol. 14, Issue 4, April 2025

#### DOI: 10.17148/IJARCCE.2025.14472

Additionally, some inconsistencies in user interfaces can occur, as different platforms adhere to distinct design guidelines and user interaction patterns.

Security and compliance are also critical factors to consider. While most cross-platform frameworks support secure coding practices, managing platform-specific security features—like biometric authentication or device encryption— might necessitate the use of native code extensions or plugins, which can add a layer of complexity.

In summary, cross-platform development has transformed the way applications are created and deployed in today's multi-device landscape. It offers a practical and efficient method for meeting the increasing demand for consistent user experiences across various platforms. While it may not completely replace native development in every case, it strikes a compelling balance between cost, performance, and scalability. For many businesses and developers, embracing cross-platform development is not just a strategic choice; it's a necessary evolution in crafting inclusive, accessible, and high-performing software applications.

#### **II. LITERATURE SURVEY**

With the advent of Cloud ERP systems, organizations have made a significant evolution in managing business processes. On-premise systems have many positive aspects but are associated with huge costs and maintenance burdens which often deter operational efficiencies. In such scenarios, organizations using cloud solutions enjoy flexibility and scalability, thus making them more responsive to changed market requirements. 'Tongsuksai' et al. show some advantages of cloud ERP systems, including reduced upfront costs and automated updates, and could be most effectively utilized by small and medium enterprises that lack extensive IT resources [6].

In addition, integration with emerging technologies is important in achieving enhanced operational productivity in cloud ERP. 'Tongsuksai et al'. (2024) acknowledged the use of Industry 4.0 technologies, like IoT and big data, supporting interconnected data exchange and real-time analytics for more accurate decision-making [7]. This integration supports research by 'Mladenova' that reveals open-source ERP systems are increasingly applicable to organizations as they are tailor-made and supported by communities, and thus very effective at an attractive low cost for organizations seeking solutions in these lines [4].

While examining the Cloud-Based ERP landscape, these implementation strategies as well as inherent challenges that derive the requirement for security and latency among others, must be addressed by organizations, as according to 'Appandairajan et al.' [2]. It emphasizes how critical success factors have to be acted upon positively on the way to implementing cloud ERP in organizations, because 'Tongsuksai' declares the characteristics of organizational, environmental, technological, and individual to help in succeeding the implementation process [3].

'Mokar' et al. also discuss the importance of Firebase Cloud Messaging (FCM) for better intercommunication between services of the cloud and applications of mobile, which organizations in their pursuit of developing user experience and responsiveness to operations would rely highly upon [5]. That is linked with a call toward developing an integrated IT infrastructure that could adequately serve the cloud ERP system.

The project management system developed by Shahnawaz Alam incorporates the traditional tools of PM such as Network Diagram, CPM, PERT, WBS, and Gantt Chart with GIS to develop an improvement in the planning, execution, and maintenance of a project. It allows one to capture geo-coded images and plot the activities of the projects on maps for a digital representation of project roll-outs. The system accommodates various data entry methods with robust, open-source frameworks and has been used on large projects, hence more applicable to the geographically dispersed and cost-sensitive projects like those of nationwide telecommunications and government initiatives. The approach applied helps the PM tools to be as efficient and accessible as possible.[8]

The project management system developed by 'Gamze Karayaz' and colleagues uses systems science to develop the concept. It, therefore, underlines a need for enhancing the knowledge of project management with systems perspectives and systems theory. Although suggestions have been made toward using systems approaches, until this paper, rigorous systems, science was not applied to support these models. Based on the illumination of systems, science and management cybernetics, this paper introduces a new model. That is demonstrated with a case study concerning multiple agencies within governments, which proves it to be successfully shown. Next, the authors identify future directions for the development and research of such a model in order to further the discipline of project management.[9]

Such a comprehensive review of the previous works portrays that although the cloud ERP systems offer immense benefits, they are definitely not the easiest thing to implement. In this regard, future research studies must be encouraged



#### Impact Factor 8.102 😤 Peer-reviewed & Refereed journal 😤 Vol. 14, Issue 4, April 2025

#### DOI: 10.17148/IJARCCE.2025.14472

and oriented toward developing integrated frameworks for the related challenges so as to make the integration of cloud ERP with other advanced technologies smoother. These allow organizations to capitalize on their complete advantage with the cloud ERP system, thereby making them more agile and competitive in the ever-changing business environment.

## **III. EXISTING SYSTEM**

These include Microsoft Project, Asana, Trello, Jira, Monday.com, and 'ClickUp' that have served as pillars of project management in most organizations. They help manage tasks, track resources, set deadlines, and visualize progress. However, despite such extensive applicability in managing small to medium-sized projects, they tend to face critical limitations when it comes to dealing with high complexities present in large projects comprising teams that operate on multiple levels and practice multi-level task hierarchies.

The other major drawback of traditional tools is their platform dependency. For example, a number of solutions like Microsoft Project are predominantly desktop-based. Thus, mobility and accessibility suffer. While many of these tools do have mobile versions, solutions like Trello and Asana offer a highly degraded capability on mobile compared to their rich desktop experience. Poor cross-platform interoperability seriously limits teams from actually being reached and responsive, particularly during conditions when it would be important to get immediate feedback or to make on-the-fly decisions.

Another significant barrier is cost, especially for small businesses and startups. The most popular services follow a subscription pricing system, including Jira and Monday.com, which can become financially unbearable when the number of people on the team increases or when a desire to integrate the feature or incorporate more applications arises. This can leave bigger companies that cannot even afford something more cost-effective in their ever-demanding use for budget strains to keep products like effective project management tools out of reach for smaller organizations searching for affordable options that can integrate all needs.

In addition, the complexity of user interfaces coupled with highly steep learning curves associated with many project management tools inhibit effective usage. On the other hand, although platforms such as Microsoft Project and Wrike are actually powerful ones, they have very intricate interfaces requiring a lot of time and training to get it right. Such complexity would confuse the users, making them not focus on the matters of critical activity of projects, result in inefficiency in its execution.

It is another area that most of the existing systems lack. They are offering purely communication-based functionality yet in a manner where the immediacy or freshness of updates may not be well presented to cater to a high-paced modern project environment. Delays in task notification and the lack of an integrated communication channel can cause a disconnection within teams, and consequently, deadlines do not get met, and project turnarounds take longer.

In addition, most of the tools that exist today are incapable of handling the hierarchical breakdown of large projects effectively. Take, for instance, ClickUp, which supports task management, yet it hardly contains intuitive elements that make it easy to break down the jobs into several levels and assign these subtasks to different team members with personalized deadlines. This confines the ability to keep track of responsibilities and dependencies of tasks and is an essential requirement for running complex projects effectively.

The data security aspect is also a chief concern in the sphere of project management. Cloud-based applications such as Asana and Monday.com do not guarantee complete safety unless the user subscribes to a more premium plan. This does not adequately protect the data at risk, and the sensitive information pertaining to projects might pose a threat regarding breach or unapproved access, dissuading organizations from using them.

Finally, other integrations with more tools and applications are mostly limited in these solutions, and the overall user experience is a bit fragmented. Most of the current products lack smooth integration with third-party applications, for instance, communication tools, file-sharing services, or calendar systems. The restriction forces teams to juggle multiple apps that usually makes them inefficient and deprives a centralized project management.

Standing as the issues in current project management systems, these challenges were variously pronounced. It is our proposed "Cross-Platform Application for Major Project Management and Tracking" that bridges the lacuna in having a flexible, cost-effective, and secure solution to gap existing systems. It's their objective approach toward changing project management for more accessible, efficient, and competitive handling of large-scale demands in modern business environments.

511

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 😤 Peer-reviewed & Refereed journal 😤 Vol. 14, Issue 4, April 2025

DOI: 10.17148/IJARCCE.2025.14472

## IV. PROPOSED SYSTEM

The proposed "Cross-Platform Application for Major Project Management and Tracking" has an objective: to beat the shortcomings of traditional management tools for project management by providing an intuitive user-friendly program custom-designed for big projects. With Flutter, the application will run silky smooth on desktops, tablets, and smartphones to provide all sorts of critical information managers, team leads, or any employee needs at their fingertips. It is the most outstanding feature of this application: its hierarchical system for managing tasks. Project managers can give complex projects to team leads, who will break them down into manageable steps and assign individual tasks with specific deadlines to team members. This way, the roles and responsibilities are clearer, allowing teams to be better organized and focused.

Another important feature of the proposed system is the real-time collaboration. The application will enable instant notifications and updates, and team members can communicate more adequately and react better to the changes happening in the app. Further, integrated messaging features ensure minimizing reliance on third-party applications for communication since all project-related discussions are bound to happen through the app.

The application takes care of the security of the data through the support of robust encryption and access control mechanisms that protect sensitive project information from unauthorized access. It also offers customizable dashboards and visualizations to help users monitor progress, recognize bottlenecks, and generate detailed reports for decision-making.

Another major benefit of this proposed system is its cost effectiveness. Its adoption is going to provide an affordable subscription model toward fulfilling the needs for advanced project management capabilities to small and medium-sized enterprises, making budget constraints not be one that blocks effective project execution.

The application further includes an intuitive, user-friendly interface with minimal learning curves on its induction. Onboarding tutorials and support resource shall be available to ensure that the teams can rapidly introduce the tool and maximize its features.

All in all, it will try to be a revolution in project management-flexibility of collaboration that is safe and user-friendly. From there, it will help solve several shortcomings within other tools, aiming at maximized productivity in most workflows, streamlined operations through effectiveness, and enabling organizations to effectively manage complex projects, thus resulting in better outcome and success.

## V. METHODOLOGY

1. Designing Interfaces and Access Based on Roles

M

Three main roles—Manager, Team Lead, and Employee—form the framework of the system. Every role has a unique user interface that is compatible with desktop, web, and mobile platforms and is designed to meet their particular duties.

#### 2. Project Development and Definition of Requirements (Manager)

By entering project details and related requirements through their interface, the manager starts the project. The Team Lead receives this data, which is kept in the central database. The system notifies the Team Lead of the new project at the same time. An integrated ToDo app allows managers to handle personal tasks as well.

#### 3. Assignment and Task Breakdown (Team Lead)

The Team Lead breaks the project down into smaller, more manageable tasks after reviewing the requirements after receiving project data. These assignments are given to qualified staff members and planned in accordance with project schedules. The database contains the breakdown and assignment details, and the corresponding employees receive automated notifications. In order to manage internal tasks, the Team Lead can also access a personal ToDo module.

#### 4. Employee Task Completion and Submission

Task assignments and due dates are communicated to employees through their interface. They can use the given personal ToDo app to further manage their workload. Employees use the system to submit documentation and proof of task completion after finishing the assigned work. Every piece of information submitted is saved and synchronized in the central database.



Impact Factor 8.102 😤 Peer-reviewed & Refereed journal 😤 Vol. 14, Issue 4, April 2025

#### DOI: 10.17148/IJARCCE.2025.14472

#### 5. Mechanism for Review and Feedback

If the submitted work satisfies the requirements, the system verifies it. The project progress status is updated and reflected in the application if it is deemed satisfactory. If not, the system enables the Team Lead to raise tickets, which leads to rework and feedback. Accountability and ongoing observation are thus guaranteed.

#### 6. Centralized Notification and Database System

The complete project lifecycle is managed by a centralized database that houses project information, task assignments, submissions, and progress reports. Additionally, it serves as a notification center, guaranteeing prompt correspondence among the manager, team lead, and employee.

7. Tracking Progress in Real Time

All stakeholders can view dynamic progress updates from the system. Real-time tracking of project status, finished tasks, unfinished assignments, and individual contributions is made possible by this feature.



## VI. RESULTS

#### 1. Functionality Based on Roles

By successfully implementing user role segregation, the application gave managers, team leads, and employees access to features that were pertinent to their roles. For example, employees could turn in work, team leads could divide and distribute tasks, and managers could only assign projects. This enhanced the application's operational flow and guaranteed role clarity.

#### 2. Task Assignment and Notifications in Real Time

Through Firebase Cloud Messaging, task assignments were sent to the appropriate users instantly. As soon as a Team Lead assigned a task, the relevant Employee was notified and the task showed up on their dashboard. Response time was increased and communication delays were reduced thanks to this real-time behavior.

## 3. Monitoring Progress and Tracking Tasks

Dynamic dashboards allowed managers and team leads to keep an eye on the status of their projects. A clear view of ongoing, finished, and pending tasks was provided by progress bars and task completion indicators. This feature improved decision-making for future task distribution and assisted in locating bottlenecks.

#### 4. The Feedback and Ticketing System

Team Leads could submit a ticket via the system if a task that was turned in did not fit the requirements. The employee was prompted by this to either update the work or submit more supporting documentation. This feedback loop made sure that misunderstandings were kept to a minimum and that project quality was maintained.

#### 6. Performance Across Platforms

Web browsers, desktop computers, and Android smartphones were used to test the system. It demonstrated the effectiveness of using Flutter for cross-platform development by operating consistently across all platforms without UI



Impact Factor 8.102  $\,\,symp \,$  Peer-reviewed & Refereed journal  $\,\,symp \,$  Vol. 14, Issue 4, April 2025

#### DOI: 10.17148/IJARCCE.2025.14472

distortion or data lag.

7. Synchronization and Data Management

Every modification made by a user was instantly reflected for other users thanks to the centralized Firebase database. All data stayed precise and consistent, regardless of the task update, document upload, or project reassignment.

#### 8. User feedback and usability

Initial testing was conducted with a sample group of students and faculty. The majority of users expressed great satisfaction with the application's responsiveness, usability, and design. Particularly valued for their simplicity and clarity were the role-based interface and real-time tracking.

Module	Metric	Result	Remarks
Authentication and Security	Login Response Time	< 300 ms	Fast authentication using Firebase Auth
	Unauthorized Access Attempts	0% Success Rate	Firebase security rules block unauthorized access.
	Rate Limiting Effectiveness	Handled by Firebase	Built-in protection against abuse via Firebase Authentication limits.
Document Management	Upload Success Rate	99%	Files stored securely in Firebase Storage with proper validation.
	Document Retrieval Time	< 150 ms	Fast download and preview using cached files and Fire store metadata.
Real-Time Communication	Task Update Sync Time	< 100 ms	Real-time updates via Firestore snapshot listeners.
	Data Persistence	100%	Offline support with Firestore local caching.
Notification System	Real-Time Notification Latency	< 100 ms	Push notifications via Firebase Cloud Messaging (FCM)
	In-App Notification Delay	<50 ms	Immediate UI updates using Firestore listeners.
System Performance	Concurrent User Support	Up to 300 Active Users (tested)	Stable performance under heavy loads.
	CPU Utilization	< 60%	Optimized Flutter app performance even during heavy tasks.
Security Evaluation	Firestore Security Rules Enforcement	100% Success	No unauthorized read/write access detected during testing.
	Authentication Token Validation	100% Success	JWT token validation handled automatically by Firebase Authentication.
User Experience	User Satisfaction Rate	90%	Positive feedback on ease of use and features.

## **VII. FUTURE SCOPE**

In actual academic and organizational settings, the cross-platform application created for major project management and tracking has shown great promise. However, a number of improvements could be made in the future to further increase its functionality, scalability, and adaptability:

## 1. Artificial Intelligence (AI) Integration

AI can be used to distribute tasks automatically according to deadlines, availability, and past performance. Proactive decision-making may be made possible by predictive analytics' ability to predict resource bottlenecks and project delays.

## 2. Offline Mode Implementation

To enable users to view and update tasks without an active internet connection, an offline feature could be added. Once connectivity is restored, the system will automatically sync data with the cloud, guaranteeing uninterrupted productivity in low-network settings.

514



## International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 😤 Peer-reviewed & Refereed journal 😤 Vol. 14, Issue 4, April 2025

#### DOI: 10.17148/IJARCCE.2025.14472

#### 3. Advanced Dashboards and Data Analytics

To offer more in-depth understanding of worker performance, project effectiveness, and resource usage, enhanced analytics modules can be implemented. For improved strategic planning, dashboards could incorporate timeline comparisons, Gantt charts, and heatmaps.

#### 4. Support for Speech-to-Text and Voice Command

The app might support voice commands for task assignment and progress updates to increase accessibility and usability, particularly for mobile users. Users with disabilities or those who prefer hands-free interaction would benefit from this feature.

#### 5. Support for Multiple Languages and Localization

The application would be usable in a variety of linguistic regions if multilingual interfaces were included. In addition to language, localization could involve currency (for business use), date/time formats, and regional user interface customization.

6. Integrating Blockchain with Audit Trails

Task assignment, submission, and approval logs that are impenetrable could be produced by implementing blockchain technology. Businesses or organizations that demand a high degree of transparency and data integrity would find this especially helpful.

7. Integrations with External Tools

For a more integrated project management ecosystem, the system could be expanded to integrate with third-party tools like Trello, Microsoft Outlook, Zoom, Slack, and Google Drive. There would be less need to switch between apps as a result.

#### 8. Gamification to Encourage User Participation

Task streaks, achievement badges, and progress levels are examples of gamification features that could be added to improve user motivation and engagement, particularly for students and younger teams.

#### 9. Improving Performance in Big Businesses

Backend optimization will be required as the system grows to accommodate big teams and intricate projects in order to effectively manage transaction management, concurrency, and heavy data loads.

#### VIII. CONCLUSION

The limitations of traditional project management tools are fully addressed in this research paper, especially when it comes to managing large-scale, multi-role projects across platforms. The suggested system provides a useful combination of scalability, real-time collaboration, task tracking, and security by utilizing cross-platform development with Flutter and integrating cloud services like Firebase.

The application's role-based task management, real-time notifications, hierarchical workflows, and centralized data handling effectively expedite the project lifecycle. Coordination and individual productivity are improved by the addition of modules like analytics, ticketing, and personal to-do lists. For today's hybrid work and learning environments, cross-platform compatibility guarantees smooth accessibility across devices.

This application is designed specifically for academic and organizational project tracking, which makes it lighter, more accessible, and more affordable than generic ERP systems.

This system stands out as a versatile and scalable project management option as businesses and institutions move toward more dispersed and digitally driven workflows. Its efficiency will be further increased, and its applicability in real-world scenarios will be expanded, with further research and future improvements, including AI integration, offline support, and advanced analytics.

#### REFERENCES

- [1]. P. Appandairajan, Z. Ali Khan, and M. Madiajagan, "ERP on Cloud: Implementation Strategies and Challenges," Dept. of Computer Science, Birla Institute of Technology & Science, Pilani, Dubai Campus, Dubai, UAE. 2012.
- [2]. S. Tongsuksai, S. Mathrani, and N. Taskin, "Cloud Enterprise Resource Planning Implementation: A Systematic Literature Review of Critical Success Factors," School of Food and Advanced Technology, Massey University, Auckland, New Zealand. August 13,2020.

## International Journal of Advanced Research in Computer and Communication Engineering

#### Impact Factor 8.102 ∺ Peer-reviewed & Refereed journal ∺ Vol. 14, Issue 4, April 2025

## DOI: 10.17148/IJARCCE.2025.14472

- [3]. T. Mladenova, "Open-source ERP systems: an overview," Department of Computer Systems and Technologies, University of Ruse, Ruse, Bulgaria. May 20,2021.
- [4]. S. Tongsuksai, and S. Mathrani, "Integrating Cloud ERP Systems with New Technologies Based on Industry 4.0: A Systematic Literature Review," School of Food and Advanced Technology, Massey University, Auckland, New Zealand. June 03,2021.
- [5]. M. Mokar et al., "Communication Technologies in Cloud-Based ERP," Institute of Computing, University of Technology.2021
- [6]. Z. Ali Khan et al., "Challenges in Implementing Cloud-Based ERP Systems," Journal of Information Systems and Technology 2022.
- [7]. Mohamed Mokar, Sallam Fageeri, Sai Fattoh, "Using Firebase Cloud Messaging to Control Mobile Applications", 2019 International Conference on Computer, Control, Electrical and Electronics Engineering, May 05,2020.
- [8]. Alam, S. (2019). An Innovative Project Management System. Department of Telecommunications, Government o f India, New Delhi, India.
- [9]. Karayaz, G., Keating, C.B., & Henrie, M. (2011). Designing Project Management Systems. Proceedings of the 4 4th Hawaii International Conference on System Sciences, FMV Isik University, Istanbul, Turkey; Old Dominion University, Norfolk, VA, USA; University of Alaska Anchorage, Anchorage, Alaska, USA.
- [10]. W. Ali, M. U. Shafique, M. A. Majeed, and A. Raza, "Comparison between SQL and NoSQL databases and their relationship with big data analytics," Asian J. Res. Comput. Sci., pp. 1–10, 2019.
- [11]. S. Jain and K. Chandrasekaran, "Industrial Automation Using Internet of Things," in Security and Privacy Issues in Sensor Networks and IoT, IGI Global, 2020, pp. 28–64.
- [12]. N. Chatterjee, S. Chakraborty, A. Decosta, and A. Nath, "Real time Communication Application Based on Android Using Google Firebase," Int. J. Adv. Res. Comput. Sci. Manag. Stud, 2018.
- [13]. A. Rahmi, I. N. Piarsa, and P. W. Buana, "FinDoctor Interactive Android Clinic Geographical Information System Using Firebase and Google Maps API," International Journal of New Technology and Research, vol. 3, 2017.
- [14]. Y. Q. Leow, S. B. Ahmad, and K.-J. Abdulkarim, "Factors affecting the adoption of enterprise resource planning (ERP) on cloud among small and medium enterprises (SMEs) in Penang Malaysia," Journal of Theoretical and Applied Information Technology, vol. 88, 2016.