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Implementation of a Lightweight Agile Workflow Management Tool

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ABSTRACT: This study delves into the transformative potential of Artificial Intelligence (AI) in logistics, focusing on its capacity to usher in an era of Intelligent Logistics. It examines the benefits, challenges, and drawbacks associated with AI's integration, portraying it as a pivotal shift towards unprecedented efficiency, innovation, and strategic advantage. The study emphasizes that while AI can significantly optimize operations, reduce costs, and enhance customer service, it also brings forth complex challenges such as legal liability concerns, complex business ecosystems, and significant resource allocation, alongside notable drawbacks. For instance, the existence of cybersecurity vulnerabilities, dependency on historical data, and the risk of workforce displacement.

Current literature tends to focus on specific implementations and their impacts rather than providing a general overview. Via a Multivocal Literature Review composed of a Systematic Literature Review complemented by a review of grey literature, this research addresses this gap by providing a nuanced view of how AI is reshaping logistics. By gathering and synthesizing diverse insights from various implementations, this study offers a holistic analysis of AI's impact. Through this comprehensive and in-depth analysis, the study aims to equip businesses with the necessary insights for informed decision-making regarding AI adoption in logistics, ensuring a balanced and effective integration of technology to meet evolving industry standards and demands.

KEYWORDS: Intelligent Logistics, Artificial Intelligence, Logistics.

I. INTRODUCTION

The logistics industry, crucial for global trade and economic growth, evolves alongside expanding economies, reshaping competition, and integrating digital technologies [1]. AI adoption in logistics signifies a transformative shift towards efficiency and innovation, necessitating effective management to navigate potential disruptions [2].

This study is motivated by the increasingly complex global supply chains, prompting a smarter approach to logistics management with AI, as seen in companies like Unilever and Maersk [3]. Additionally, many companies lag in leveraging AI due to a lack of understanding and preparedness, highlighting the need for comprehensive research on AI's benefits, challenges, and drawbacks in logistics [4].

This study is dedicated to examining the impact of AI integration within the logistics sector, aiming to equip decision-makers with a nuanced understanding that can inform strategic planning in this evolving environment. The central research question posed is: How does AI incorporation impact the logistics field? This research strives to provide a comprehensive assessment that could guide companies in making informed decisions regarding the adoption of AI technologies to enhance their operational efficacy and reputation. During the initial review of existing literature, it was noted that most studies tend to focus on specific implementations, often only discussing the benefits, challenges, and drawbacks within those limited contexts. In response, this research will employ a Multivocal Literature Review (MLR), incorporating both a Systematic Literature Review (SLR) and an analysis of grey literature. This approach will allow for the consolidation of diverse insights from various implementations, fostering a holistic view of AI's impact across the logistics industry. The findings will be meticulously analyzed and synthesized to produce a detailed, consolidated report that comprehensively addresses the multifaceted effects of AI on logistics.



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II. LITERATURE REVIEW

Agile workflow management tools have become central to modern project delivery, enabling iterative planning, collaboration, and adaptability. According to Behrens et al. (2021), Agile Project Management is effective when tools operationalize its core values—iteration, timeboxing, and responsiveness to change—helping organizations manage uncertainty and accelerate decision-making.

Building on this, Anifa et al. (2024) conducted a systematic review highlighting how Agile approaches are increasingly adopted across industries, with tools serving as enablers of daily communication and continuous improvement. Their findings emphasize that workflow management platforms must balance flexibility with usability, ensuring teams can adapt quickly without being overwhelmed by complexity.

Further, IEEE studies (2024) comparing tools such as Jira, Rally, and Asana show that while configurability supports diverse contexts, excessive complexity can hinder adoption. This tension has led to the rise of lightweight alternatives that focus on modular templates, guided workflows, and integrated ecosystems connecting DevOps, QA, and communication platforms.

Together, these studies demonstrate that the future of Agile workflow management tools lies in **AI-assisted automation, data-driven insights, and enhanced support for distributed teams**. By integrating predictive analytics, backlog grooming, and asynchronous collaboration features, tools can extend Agile's promise of adaptability and continuous improvement while remaining accessible to startups and enterprises alike.

III. METHODOLOGICAL APPROACH

The methodology section incorporates a MLR, starting with SLR through the PRISMA guidelines, using the keywords "Artificial Intelligence" and "Logistics" across databases such as IEEE Xplorer, Scopus, ACM Digital Library, and Web of Science. The initial search yielded 183,894 studies, which were refined through multiple filters. The first filter narrowed the selection to 12,847 studies by requiring both keywords in the title, abstract, or keywords sections. A second filter reduced this number to 194 by requiring the keywords in the titles alone, and a third filter further refined this to 138 studies from 2020 to 2023. After a manual review of titles, abstracts, and conclusions, 14 studies were selected.

In addition to the systematic literature review, the research included a review of grey literature to incorporate more recent and practical insights, thereby supporting and validating the findings from the SLR. These sources were chosen for their recognition by reputable entities and their suggestive titles. This review targeted articles published by governmental organizations such as UNESCO, the European Parliament, and the European Commission, as well as esteemed newspapers like Forbes and Financial Times, and industry-leading companies and consultancies including DHL, Deloitte, McKinsey, IBM, and BCG. Contributions from top universities like Stanford and MIT were also examined. This selection of grey literature was strategically aimed at supplementing the SLR with up-to-date details and real-world applications from influential and authoritative sources. From this review, 17 sources were identified, offering practical insights and real-world applications that enriched the research's theoretical findings.

For future studies in the rapidly evolving fields of logistics and artificial intelligence, the application of the Design Science Research (DSR) methodology is advisable. The iterative cycles of DSR are well-suited to adaptively incorporate the continuous changes and emerging trends in both logistics and AI, thus ensuring that research outcomes remain relevant and practically applicable to the dynamic nature of these fields [5].

IV. SYSTEM ARCHITECTURE AND METHODOLOGY

Agile workflow management tools inspired by Jira typically combine a modular system architecture (with layers for data, application logic, and user interface) and Agile methodologies like Scrum and Kanban. They emphasize iterative development, backlog management, sprint planning, and continuous delivery

└ Three-tier architecture

- Data Layer: Stores issues, tasks, sprints, and user information in a relational or NoSQL database.



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- Application Layer: Implements business logic such as sprint planning, backlog prioritization, and reporting.
 - Presentation Layer: Provides interactive dashboards, boards, and reports for users.
 - └ Microservices orientation
 - Tools often adopt microservices for scalability, allowing independent services for authentication, notifications, reporting, and integrations.
 - APIs (REST/GraphQL) enable integration with CI/CD pipelines, version control systems, and external apps.
 - └ Workflow engine
 - Customizable workflows define states (To Do → In Progress → Done).
 - Automation rules trigger transitions, notifications, or updates.
- Scalability & collaboration
- Cloud-based deployment supports distributed teams.
 - Role-based access ensures secure collaboration across departments.

4.1 Methodology: Agile Practices in Workflow Management:

- Scrum methodology
 - Sprint Planning: Teams plan work in time-boxed iterations.
 - Backlog Grooming: Tasks are prioritized using drag-and-drop boards.
 - Sprint Boards: Visualize progress with customizable boards.
 - Retrospectives: Continuous improvement after each sprint.
- Kanban methodology
 - Focuses on continuous delivery without fixed iterations.
 - Uses work-in-progress (WIP) limits to avoid overloading teams.
 - Boards show tasks flowing smoothly across stages.
- Hybrid Agile approaches
 - Many tools allow mixing Scrum and Kanban depending on team needs.
 - Templates and dashboards help teams adapt quickly.

Iterative improvement

- Agile tools emphasize delivering a minimum viable product (MVP) first.
- Feedback loops ensure continuous refinement of features.



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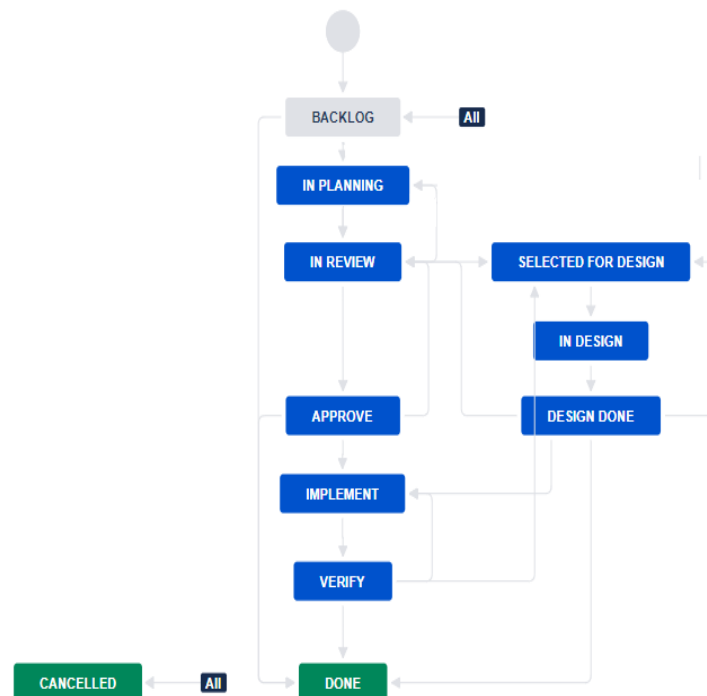


Figure 3: fig.4.1: Architecture Diagram

V. IMPLEMENTATIONS, APPLICATIONS & RESULTS

This chapter contains examples and implementations of AI in the process of logistics. From Purchase and Supply Chain, Storage, and Distribution, AI technologies are revolutionizing every step of the logistics process [4].

- Purchase and Supply Chain

Image Processing: Integrating image recognition technology enhances the efficiency and cost-effectiveness of document management systems. SF Express, a leading logistics company, demonstrates this transformative potential by employing machine image recognition in waybill processing, significantly reducing the need for manual labor, improving accuracy rates to above 90% and minimizing errors while optimizing resource utilization [22, 9, 12].

AI-Powered Customer Care: Integrating AI-driven customer service, utilizing voice semantic analysis, call center data, and chatbots, significantly improves real-time voice recognition and response generation. This intelligent system provides personalized assistance around the clock in the customer's language, reducing response times and minimizing the need for extensive customer service teams. As a result, logistics providers can offer more efficient and faster customer service, enhancing the experience for both customers and the provider [22, 12].

Inventory Management Algorithms: Powered by AI, revolutionize logistics by optimizing inventory levels and minimizing stockouts. Through historical and real-time data analysis, AI anticipates demand patterns, ensuring product availability and efficiency while reducing returns. It also enhances inventory visibility, automates restocking, and generates predictive alerts, cutting operational costs. Furthermore, AI forecasts demand accurately, automates purchasing, and drives optimization, providing a competitive advantage in the logistics sector [22, 4, 11].

- Storage

Facial Access Control: Implementing facial recognition in warehouse access control offers heightened security, eliminating the limitations of traditional access methods and providing robust surveillance for post-event investigations, guaranteeing safety to all the inventory in the warehouse [9].



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Warehouse Robotics: AI-driven robotics facilitate seamless goods handling, from accurate picking with intelligent robots to streamlined loading and unloading processes. Innovations such as autonomous driving in unmanned trucks, voice picking, and Augmented Reality visual picking elevate accuracy and speed. Automated Guided Vehicles minimize human intervention, enhancing safety and efficiency in tasks like sorting and pallet movement. Pick-to-Light and Put-to-Light systems reduce task time and errors using barcode scanners synced with digital displays. The adoption of voice recognition software optimizes picking routes, as demonstrated by industry leaders like Amazon, highlighting AI's potential in warehouse logistics for innovation and efficiency enhancement [22, 4, 9].

- Distribution

Digital Mapping: Leveraging Geographic Information System GIS technology integrated with AI, this approach provides high-precision positioning, precise address matching, and path planning. Such capabilities are pivotal for informed logistics decision-making. Advanced mapping technologies facilitate accurate location tracking and resource allocation, significantly enhancing the efficiency of logistics operations [9, 12].

Smart Roads: Advanced Road systems integrate sensors, solar panels, AI, and big data analytics for efficiency, security, and eco-friendliness. Embedded technologies enable communication with autonomous vehicles and interconnect every item through AI and IoT sensors for highly efficient transport [22, 28].

Dynamic Routing Technologies: AI excels in optimizing backhauls and finding the shortest path to destinations, reducing empty return trips and fuel waste. Freight apps like Convoy and Uber enable efficient backhaul delivery, while UPS's On-Road Integrated Optimization and Navigation (ORION) system dynamically routes vehicles, saving up to 12 miles per driver per day. This significantly improves efficiency and reduces CO2 emissions [22, 29, 11].

Predictive Maintenance: Using machine learning, predictive maintenance strategies analyze historical and real-time data to forecast vehicle upkeep, aiming to extend fleet life and reduce downtime. AI and ML integrate data from IoT devices, GPS, and vehicle records to anticipate mechanical issues [22].

Unmanned Delivery Technologies: Unmanned Aerial Vehicles, Ground Vehicles, and warehouses, powered by AI and robotics, revolutionize logistics, cutting costs and enhancing efficiency. These innovations use sensor data fusion and advanced algorithms for precise route planning. Autonomously automated vehicles transport goods quickly and efficiently, with semi-autonomous options like platooning increasing capacity and reducing costs. Regulations often require a human driver in vehicles, but Rolls-Royce's autonomous ship, developed with Intel, navigates waterways efficiently for faster delivery [22, 9, 12, 7].

Implementations	Features
Purchase and Supply Chain	Forecast Demand and Inventory Management Algorithms
	Image Processing
	AI-Powered Customer Care
Storage	Warehouse Robotic Automation
	Biometrics Access Control
Distribution	Dynamic Routing Technologies
	Vehicles Predictive Maintenance
	Unmanned Delivery Technologies
	Digital Mapping
	Smart Roads

Table 1. MLR Implementations Insights

V. RESULTS

This section demonstrates the output interfaces of the proposed Lightweight Agile Workflow Management Tool. The following screenshots represent the key pages and functionalities such as login, dashboard overview, ticket creation, and the ticket dashboard interface. Each interface is designed for clarity, ease of navigation, and real-time project tracking.



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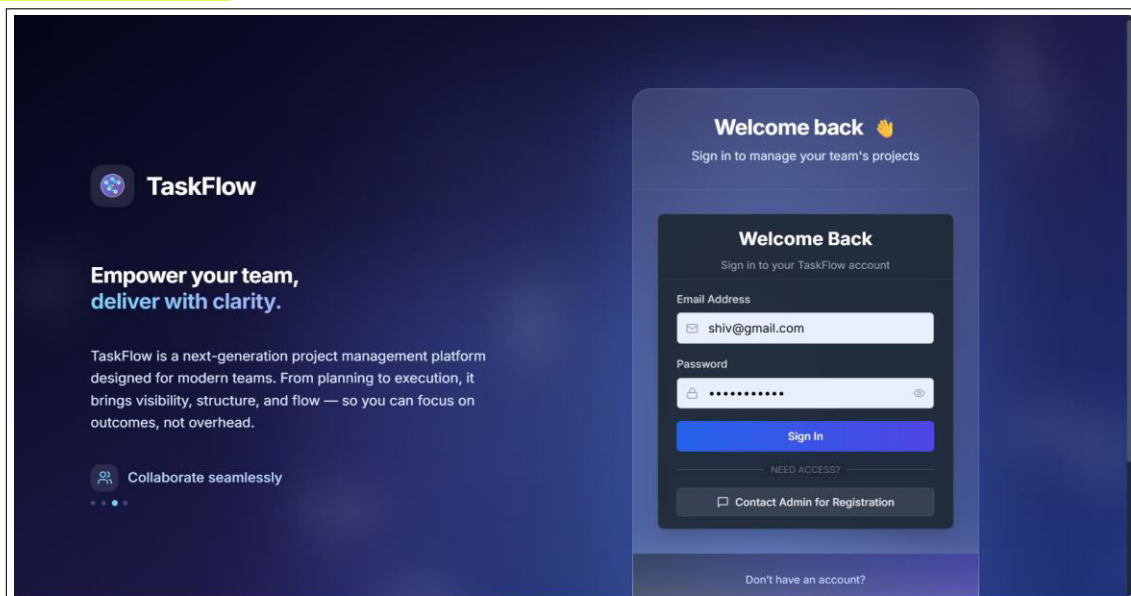


Figure 4: fig 5.1: Front Page

The login interface provides secure access for Super Admins, Admins, and Team Members. It includes input validation and supports token-based authentication (JWT/OAuth2) for security.

The dashboard page acts as the central hub of the system, summarizing key metrics such as ongoing projects, sprints, and task progress. It allows Admins and Project Managers to quickly assess workload and status through visual indicators.

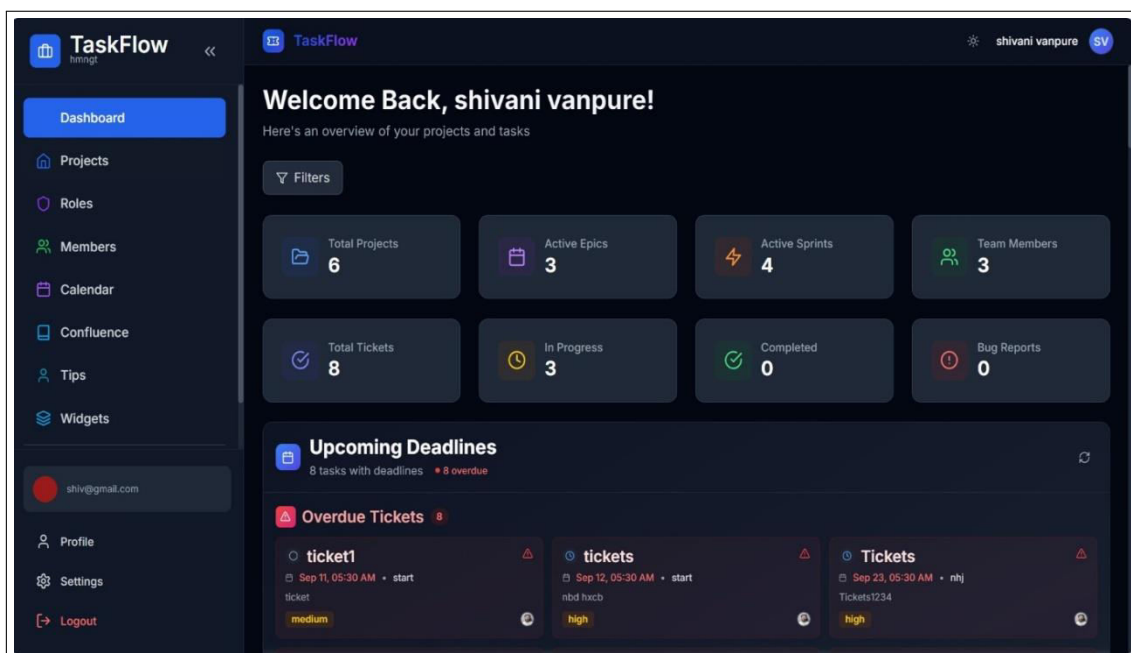


Figure 5: Fig 5.2: Dashboard Page



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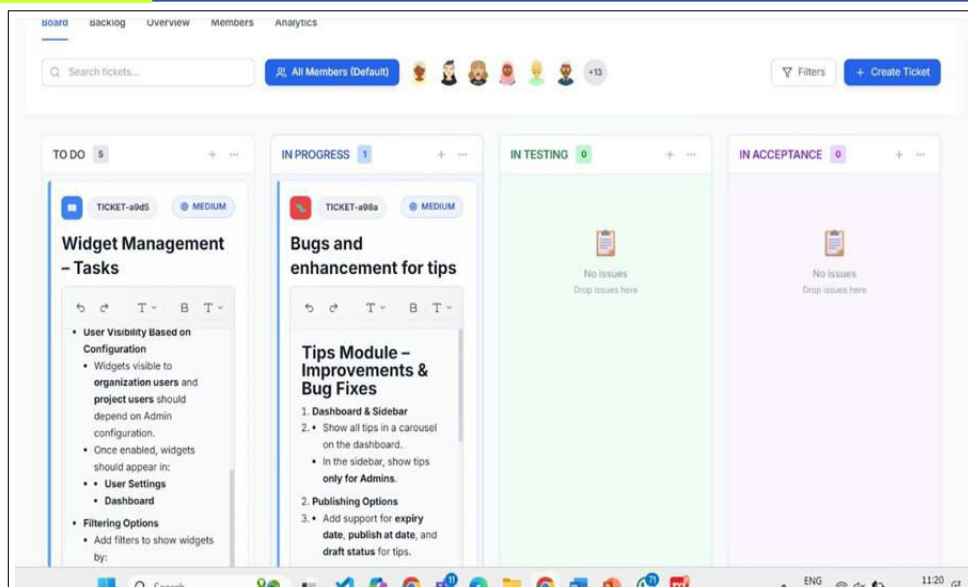


Figure 7: Fig 5.3: Tickets Page

The tickets page enables users to create, assign, and track tickets corresponding to specific issues or tasks within a sprint. Each ticket includes fields for description, assignee, status, priority, and logged work.

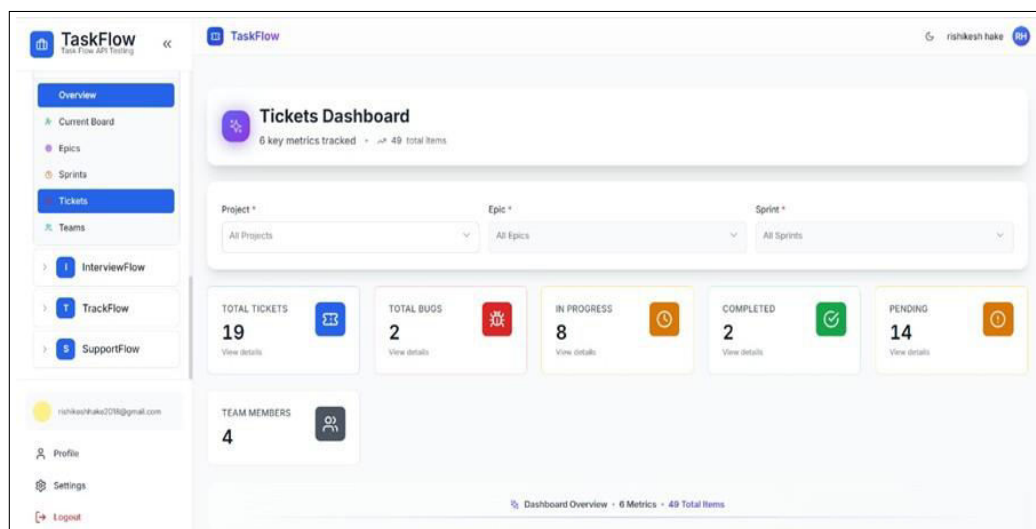


Figure 8: Fig 5.4: Tickets Dashboard

The tickets dashboard displays the status of all tickets in a Kanban-style view (To Do, In Progress, Done). It provides real-time synchronization between users, allowing quick visual updates and better collaboration.

Overall, the implemented interfaces of the **Lightweight Agile Workflow Management Tool** demonstrate a clean, functional, and user-friendly approach to Agile workflow management. Each module ensures that team members, project managers, and administrators can efficiently perform their roles, contributing to better project transparency and productivity.



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VI. CONCLUSION & FUTURE WORK

Artificial intelligence stands at the forefront of a logistics revolution, offering profound efficiencies and sparking innovation across global supply chains. As this technology reshapes the landscape, it challenges traditional models with its transformative potential. While AI integration enhances operations and customer service, it also brings complex challenges that require careful navigation, including ethical considerations and the need for substantial resource allocation. Following this conclusion, Table 1, 2, 3, and 4, present detailed overviews of the application of AI in logistics, each focusing on a different dimension. Table 1 displays the benefits, Table 2 highlights the drawbacks, Table 3 identifies the challenges, and Table 4 illustrates the implementations. Each table includes the categories of the found features, identified in the performed MLR. The categories, presented in each table, were not explicitly identified in the literature but were displayed to aggregate similar features in order to facilitate a more organized and insightful analysis. Future research must continue to evaluate these dynamics comprehensively to ensure AI's role in logistics evolves in a sustainable and ethical manner, fostering both technological advancement and societal benefit. Embracing this change will equip businesses to leverage AI effectively, driving forward industry standards and operational excellence [1, 2, 11, 13, 22].

6.1 Future Work:

1. AI-Driven Automation

- Integrate **smart backlog grooming**: automatically suggest priorities based on deadlines, dependencies, and team capacity.
- Use **predictive analytics** to forecast sprint outcomes and detect risks early.
- Provide **AI-generated summaries** of tasks, stand-ups, and retrospectives.

2. Simplified User Experience

- Focus on a **minimalist interface** that avoids Jira's complexity.
- Offer **drag-and-drop workflow customization** so teams can adapt quickly without heavy configuration.
- Mobile-first design for easy updates on the go.

3. Collaboration Enhancements

- Real-time **virtual stand-ups** and **async updates** for distributed teams.
- Integration with Slack, Teams, and email for seamless communication.
- Shared dashboards for cross-functional visibility.

4. Modular Customization

- Provide **industry-specific templates** (software, marketing, product design).
- Allow teams to add/remove modules (e.g., bug tracking, roadmap planning) without clutter.
- Support **open APIs** for integration with DevOps tools like GitHub, GitLab, Jenkins.

5. Data & Insights

- Build **velocity tracking dashboards** with visual analytics.
- Introduce **customer feedback loops** directly into workflows.
- Predictive insights on delivery timelines and resource allocation.

6. Cost Efficiency & Accessibility

- Keep the tool **lightweight and affordable**, targeting startups and SMEs.
- Explore **open-source extensions** to encourage community-driven innovation.
- Provide a freemium model with scalable features.

VII. ACKNOWLEDGEMENT

We would like to express our sincere gratitude to all those who contributed to the development of our Agile Workflow Management Tool. This project was inspired by modern platforms such as Jira, and it has been shaped by the principles of Agile methodology to provide a lightweight, user-friendly solution for effective workflow management.



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We acknowledge the guidance and support of our mentors, faculty members, and industry experts whose insights helped us refine the tool's design and functionality. We are also thankful to our peers and colleagues for their valuable feedback during testing and implementation phases, which greatly enhanced the usability and performance of the system.

Finally, we extend our appreciation to the open-source community and developers whose frameworks and libraries made this project possible. Their contributions laid the foundation for building a tool that empowers teams to collaborate efficiently, adapt to change, and achieve continuous improvement.

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