Applying Jira - A Tool for the Organization and Optimization of Work Processes in the Machine Industry Based on the Experience of the IT Industry

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Abstract **- This article explores the application of Jira, which is considered a widely used project management and issue-tracking tool, in the work processes of the machine and IT industries. Jira's flexibility and adaptability make it a valuable tool for streamlining workflows, improving collaboration between employees, and improving overall efficiency in the dynamic and complex environment of the machine industry. The article gives a brief overview of the main Jira's features, discusses its relevance to the machine industry. The findings highlight the potential benefits of integrating Jira into the machine industry workflows, highlighting its positive impact on project management and productivity. Jira, a web tool developed by Atlassian, is extensively used for project management across different organizations, significantly enhancing efficiency. This article outlines Jira's features, explores its significance in project management, and showcases real-world examples from a machine industry firm to demonstrate its practical utility in organizing work. This research aims to broaden our knowledge of how Atlassian Jira can enhance project workflows and bolster project outcomes within the machine industry, based on insights gleaned from existing literature.**

Keywords **- Jira, process optimization, machine indstry, IT industry.**

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1. Introduction

As projects become more intricate and expansive, there is a growing necessity for robust project management tools. Atlassian Jira is gaining traction as a favored option, providing teams with a flexible platform to plan, monitor, and oversee projects effectively. Initially utilized in the software industry, Atlassian Jira has extended its reach to various other sectors, including the machine industry. This article aims to examine the attributes and capabilities of Atlassian Jira and assess its effectiveness and suitability for project management in the machine industry.

Jira is a versatile tool aimed at enhancing project management and tracking issues, particularly tailored to facilitate collaboration among development teams. Its primary functionalities encompass customizable workflows, task monitoring, and live collaboration among team members, rendering it highly effective across diverse industries. Renowned for its flexibility, Jira seamlessly accommodates various methodologies like Agile, Scrum, and Kanban, and integrates seamlessly with other Atlassian products such as Confluence and Bitbucket.

Past studies have emphasized the link between employing sophisticated project management tools and achieving project success. Furthermore, Jira's praised flexibility and scalability are recognized as pivotal elements in accommodating the varied requirements of contemporary project teams.

The machine industry is marked by intricate procedures, a range of stakeholders, and a demand for effective project management. Jira, renowned for its adaptability in project management and issue tracking, is extensively utilized. This research seeks to delve into Jira's implementation in the machine industry, focusing on enhancing collaboration, increasing project transparency, and refining workflows.

Jira's flexibility suits the intricate nature of the machine industry, characterized by interconnected tasks and diverse teams. Its project management features empower teams to meticulously plan, monitor, and execute projects. With customizable workflows, Jira effortlessly adjusts to meet industry-specific needs, seamlessly integrating into established processes.

2. Jira Features

Jira is an online tool accessible via the web from any location and device. It offers free usage for up to 10 users, with billing based on the Atlassian group thereafter. Here are some fundamental actions available in Jira [1]:

- Agile Project Management: Jira excels in supporting Agile methodologies, providing a range of features beneficial for Agile teams. These include mapping user tasks, planning sprints, and overseeing various work tasks. Jira enables teams to visualize and prioritize tasks, fostering iterative development and ongoing enhancement.
- Customizable Workflows: Jira offers customizable workflows that enable organizations to adjust processes according to their requirements. For instance, a software development team can design a workflow that seamlessly incorporates stages like code review, testing, and deployment. This flexibility enhances efficiency and promotes a well-structured project framework.
- Real-time Collaboration: Jira fosters real-time collaboration among employees by incorporating functions like comments, user identification, and notifications. This promotes efficient communication within teams, ensuring everyone remains aligned and minimizing the risk of misunderstandings or delays. Additionally, users have the ability to track the history of previous actions.
- Reporting and Analytics: Jira's reporting capabilities offer project managers within the machine industry comprehensive insights into project advancement, team efficacy, and possible bottlenecks [2]. Leveraging these functionalities can greatly enhance data-driven decision-making and project refinement [3].

Jira is a widely used tool for project management and tracking workflows, offering a diverse array of features and functionalities for overseeing projects, tasks, and workflows. Jira offers a comprehensive suite of features including project management, task tracking, boards, reporting, administration, task filtering, workflow management, customization options, task types, permissions management, notifications, integrations, settings configuration, automation, system, calendar, roadmaps for planning and monitoring work processes, work task status (with status tracking such as open, in development, in testing, in review, on hold, or completed) and the name of an employee responsible for completing a task. The system includes options to display each employee's photo and personal details, along with task type, task description, and the ability to add comments with a saved history. Additionally, the duration of the task can be specified in days, weeks, months, hours, or story points.

3. Jira in the Machine Industry

In the machine industry, Jira serves as a valuable tool for overseeing product development, quality assurance, and maintenance tasks. Through its Agile Boards, teams can effectively embrace Agile methodologies, facilitating iterative development, streamlined backlog management, and real-time collaboration among different functional teams [4]. Multiple benchmark studies underscore Jira's efficacy in Agile settings [5].

The machine industry frequently faces complex issues demanding prompt and precise resolutions [6]. Jira's issue-tracking system helps to efficiently identify, prioritize and address these issues, underscoring the significance of vigilant problem monitoring throughout project execution to ensure success [7].

Jira's broad integration capabilities facilitate smooth with other tools commonly used in the machine industry, such as CAD software, version control systems, and testing tools [8]. This integration streamlines data flow and provides a unified view of project progress [9].

Utilizing Jira within the machine industry presents notable benefits, spanning enhanced project management, collaboration, and problem-solving. Through harnessing Jira's functionalities, professionals in the machine industry can streamline workflows, enhance project transparency, and ultimately boost productivity. This article highlights Jira's significance in tackling engineering challenges and offers an opportunity for further research into its long-term impact on project success.

Continued investigation into Jira's capabilities within the machine industry highlights its versatility in meeting diverse project needs. Beyond fundamental project management and issue tracking, Jira provides sophisticated tools tailored to the intricate demands of engineering projects. With its potential to simplify and monitor workflows, Jira holds promise in revolutionizing the landscape of engineering project management.

A key benefit of Jira is its seamless integration with various tools commonly utilized in the machine industry, including CAD software [10], dashboards, Version Control Systems [11], testing tools, CAD and PLM systems [12], IoT (Internet of Things) integration, maintenance and Field Service Integration, as well as documentation and knowledge base integration.

4. Experiment in the Machine Industry

For the purposes of this research, collaboration was initiated with a company operating in the machine industry. Initially, an investigation was conducted to ascertain whether the company already employs a specific tool for organizing work processes. It was found that the company utilizes the SharePoint tool, refuting two hypotheses: that they do not use any software tool and that they manage and monitor work manually.

4.1. Company History in the Machine Industry

The company's current workflow is structured around dividing tasks into departments. When an order is initiated, each department contributing to the solution adds the required details. Every employee can access the order, albeit with varying levels of visibility determined by their profile permissions. While some profiles can only view the order, others have the authority to make modifications.

Tasks are allocated to employees through varied methods across different departments. While some departments use email communication to assign tasks, others employ an order system to allocate resources (employees). Each department follows distinct procedures for work allocation, in adherence to ISO 9001 standards.

To estimate the duration of work tasks, they perform manual calculations during the preparation of bids. This involves verifying the availability of resources, including machinery and employees, and allocating them accordingly.

The current operational structure for fulfilling requests for a specific service or product from the company is outlined below.

Upon receiving a client's request for an offer, a project task is initiated, detailing specific requirements such as length, height, width of the object, the chosen material, facade and roof material. If the client approves the proposed design, practical preparations commence accordingly.

Once the design task is received by the design department, they conduct a thorough review before commencing the statistical calculation process. Using the Tekla program, the project is drafted with detailed structural specifications, allowing a 3D visualization of the object. Additionally, a general drawing section determines the specific screws and materials to be utilized. Once calculations are finalized and modeling and drawing creation are complete, the project is sent to the customer for review and confirmation.

Upon confirmation, the required quantity of materials is calculated, and assembly drawings are initiated. Subsequently, single part drawings are generated based on the work completed thus far. Technologists oversee the documentation and verification process, which may involve seeking additional clarification or directly approving the progression of the process.

The drawings created thus far are transferred to the IT department for conversion into specialized software, facilitating the placement of parts onto machines for cutting and material preparation. Afterwards, the parts are transported to the production department, where each drawn component is placed onto appropriate machinery to commence the production process. Once all parts, such as poles and girders, are fabricated, they undergo inspection by production control before advancing to later stages.

Completed parts are transported to the welding line where they undergo welding according to the provided drawings, with welding inspections conducted at this stage. Following welding, the manufactured parts proceed to the corrosion cleaning section, housed in specialized chambers. Once this phase is completed, the construction components are labeled and directed to the corresponding paint chambers. Supervision of operations within each facility is overseen by the designated plant manager.

The produced parts are loaded onto a truck and transported to the designated construction site for building assembly. Accompanied by a specific team of workers and a crane, the construction process is facilitated to erect the building.

4.2. Implementing Jira in a Machine Industry Firm's Operations

A presentation was delivered on Jira's functionality and potential benefits. Subsequently, a practical experiment was undertaken within the company, employing Jira in their work processes for a single sprint duration (2 weeks). Starting from the initiation of a particular work process, tasks were organized, time estimates were made, and suitable resources, including personnel and machinery, were allocated.

For example, a work plan was devised for constructing and producing a 500 square meter hall. Comprehensive time estimates were generated and later divided into sprints. A total of 23 work tasks were established for the entire process, involving various participating sectors, and these tasks were then allocated to respective employees accordingly. Figure 1 depicts an initial board outlining the defined work tasks, all currently categorized as TO DO, indicating that work has yet to commence on them.

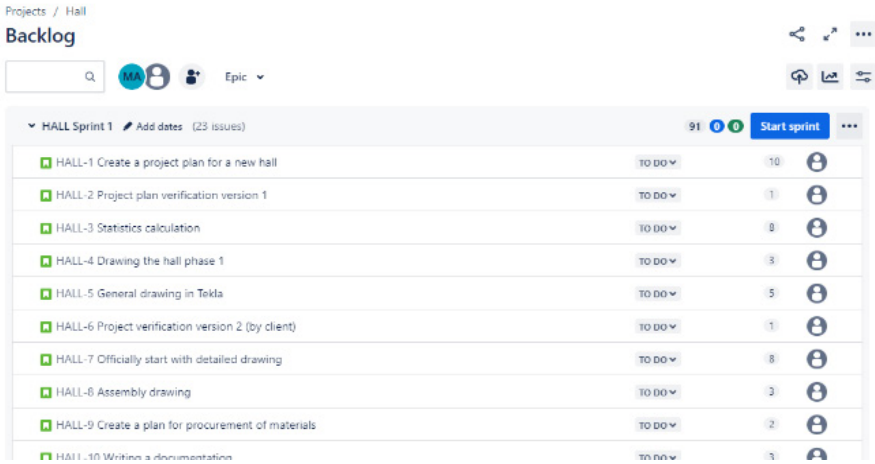

Figure 1. Initial backlog with tasks

Figure 2 displays an initial board featuring work tasks, following the commencement of the work process, referred to as "Sprint 1".

The board comprises columns labeled TO DO for planned tasks for this sprint, IN PROGRESS for tasks currently being worked on, TESTING for completed tasks waiting to be checked, tested and verified and DONE for tasks fully completed and checked, ready for final deployment or delivery to the end user or customer.

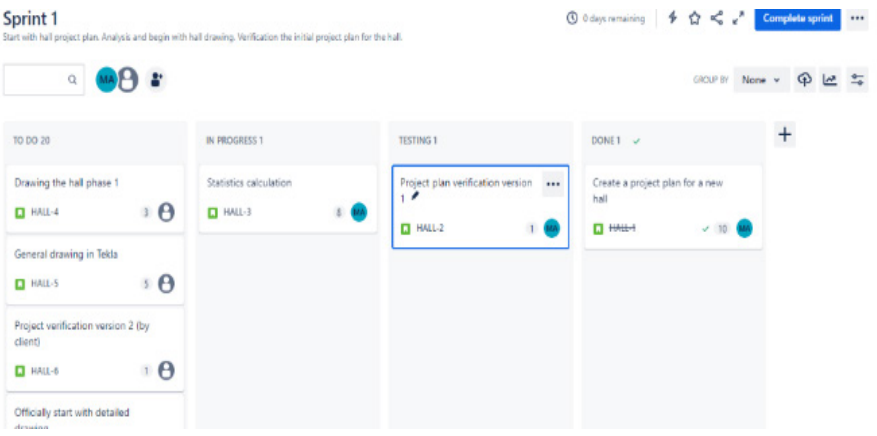

Figure 2. Board with tasks

A project timeline has been established, focusing on the creation phase of the project in our example. However, additional epics may also be included here. Epics represent the largest logical unit in Jira, encompassing multiple work tasks with smaller logical units represented by stories and tasks.

Before the sprint concludes, it is observed that the majority of planned work tasks is completed and moved to the last column - DONE. For any remaining tasks not fully finished during this sprint but deemed a priority, they will be seamlessly transitioned to the next sprint for continued work.

Reports will investigate reasons behind any incomplete planned work in the sprint. If remaining tasks are deemed lower priority, they may be returned to the project backlog for potential inclusion in future sprints as needed.

Figure 3 illustrates the progress of the sprint, indicating that 68% of the planned work has been fully completed, which is a notably high percentage.

Additionally, 27% of the work has already commenced and may be nearing completion, while the remaining 5% represents tasks that have yet to be initiated due to time constraints. Before transitioning tasks to the next sprint, it is crucial to confirm the status of the ongoing 27% of work (whether in the initial, middle, or final phase) to estimate the required time for completion in the subsequent sprint.

Figure 3. Progress of the sprint

Figure 4 depicts a burndown chart illustrating the success of the previous sprint, with the responsible individual tasked with evaluating its effectiveness.

In this instance, the sprint is deemed successful, especially considering it is the initial sprint and represents a new approach that has not been previously employed.

Figure 4. Sprint burndown

At the beginning of the sprint the duration is established, defining the start and end dates. Goals for the impending sprint are assigned, with three objectives outlined for completion by the sprint's conclusion:

1. Commence project definition for the construction of the hall.
2. Analyze and initiate hall drawing.
3. Validate the initial project plan for the hall.

5. Jira in the IT Industry

A survey was conducted in IT companies to assess the utilization of Jira within the industry and gauge the extent of its benefits for those who employ it.

Jira is widely acknowledged as a cornerstone tool in the IT sector, serving as one of the top choices for project management and fostering collaboration among software development teams and IT experts. Renowned for its adaptability and compatibility with Agile methodologies like Scrum and Kanban, Jira stands out as a preferred solution for overseeing software development projects. Its customizable features, broad integrations, and versatile functionality make it indispensable for IT professionals involved in project management and software development. Ultimately, Jira aids teams in maintaining organization, fostering efficient collaboration, and ensuring the delivery of top-notch software products.

An anonymous electronic survey was conducted among IT companies with locations in Macedonia, Serbia, Turkey, Germany, and Sweden.

The study carried out in IT companies thoroughly validated the initial assumptions and demonstrated the necessity for its implementation. All employees surveyed utilize Jira as their primary tool for task organization, with 57.7% of them considering it superior to alternative tools for the same purpose. Additionally, over 80% of respondents stated that Jira significantly simplifies their work, while 57.1% believe that they would struggle to work without a task organization tool.

The respondents primarily utilize common functionalities of the tool, including daily work task board overview, generating reports, analyzing burndown charts, managing tasks, and monitoring work progress. Additionally, 16.7% reported using all available features of the tool. Notably, all employees, not just managers, utilize the tool according to 100% of respondents. Furthermore, 71.4% reported using the tool for both generating reports and managing tasks, while 28.6% exclusively use it for managing tasks and processes. Diagram 1 visually represents the processed survey results.

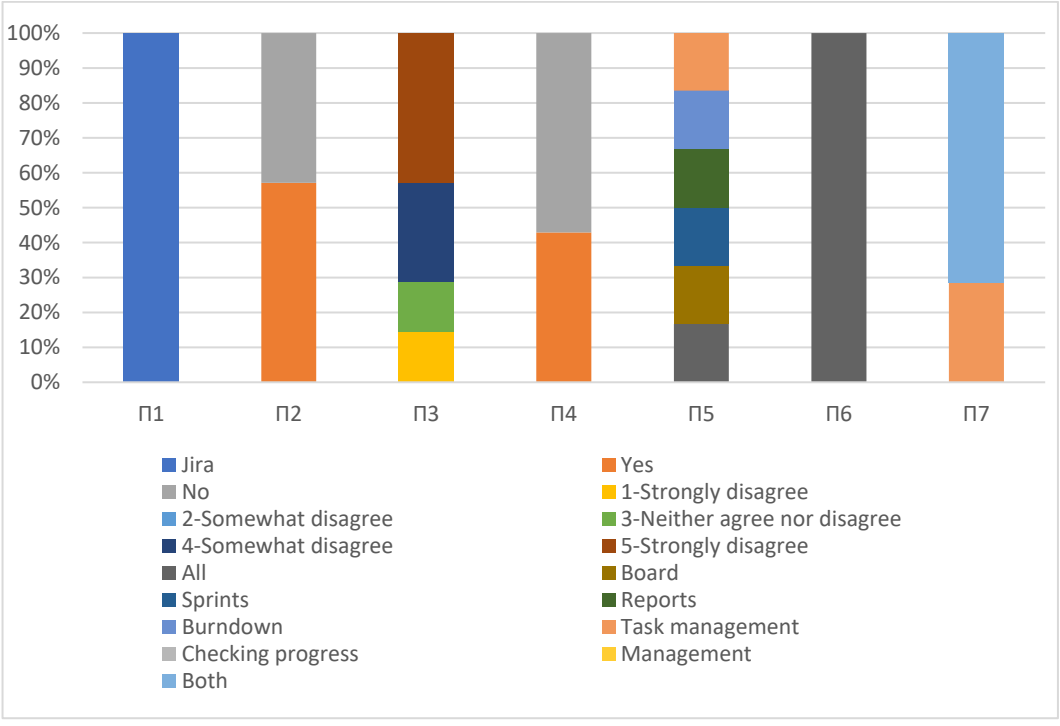

Diagram 1. Results from the survey

6. Conclusion

Jira stands out as a robust project management tool that plays a key role in enhancing project effectiveness. Its customizable workflows, Agile methodology support, and real-time collaboration capabilities render it highly beneficial across diverse industries.

Based on the research findings, it is evident that Jira is prevalent across multiple industries, albeit predominantly utilized in the IT sector. However, there is potential for its adaptation and utilization in the machine industry as well. The outcomes of the study validate its relevance and necessity. The machine industry is progressively integrating software into its operations, resulting in enhanced workflow optimization, expedited processes, and reduced error rates.

Additionally, there is a growing trend of communication and collaboration between the machine and IT industries, with much of the software developed finding practical application in the machine industry.

A survey carried out in the IT industry regarding the utilization of Jira effectively substantiated the hypothesis that it is a ubiquitous tool in the software realm. Nearly all employees have utilized it at least once during their work, with a significant portion actively employing it presently. The tool provides extensive organization and optimization of work tasks, along with a clear visual representation of them. It is user-friendly and offers numerous features for both detailed and comprehensive monitoring of the work process.

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