

ANALYSIS OF THE EFFECTIVENESS OF THE SCRUM METHODOLOGY IN AN EMPLOYEE TASK MONITORING APPLICATION

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Abstract— This study evaluates the effectiveness of the Scrum methodology in improving the productivity of IT development teams at PT. Erajaya Swasembada Tbk, focusing on the development of an employee task monitoring application. Using a mixed-methods approach, it combines qualitative insights from interviews and observations with quantitative metrics from Evidence-Based Management (EBM), including Employee Satisfaction, Lead Time, Velocity, and Innovation Rate. The findings show that Scrum significantly enhances team collaboration and transparency, with an average Employee Satisfaction score of 4.19 out of 5 and Velocity exceeding targets in several sprints (e.g., 167.5% in PROD Sprint 7). However, inconsistent Scrum practices and limited inter-team communication remain challenges. This study provides recommendations to optimize Scrum implementation to improve project outcomes.

Keywords: Agile, Employee Task Monitoring, Evidence-Based Management, IT Development, Scrum.

Intisari— Penelitian ini mengevaluasi efektivitas metodologi Scrum dalam meningkatkan produktivitas tim pengembang IT di PT. Erajaya Swasembada Tbk, dengan fokus pada pengembangan aplikasi pemantauan tugas karyawan. Menggunakan pendekatan metode campuran, penelitian ini menggabungkan wawasan kualitatif dari wawancara dan observasi dengan metrik kuantitatif dari Evidence-Based Management (EBM), meliputi Kepuasan Karyawan, Lead Time, Velocity, dan Innovation Rate. Temuan menunjukkan bahwa Scrum secara signifikan meningkatkan kolaborasi dan transparansi tim, dengan skor rata-rata Kepuasan Karyawan 4,19 dari skala 5 dan Velocity yang melampaui target pada beberapa sprint (misalnya, 167,5% pada PROD Sprint 7). Namun, praktik Scrum yang tidak konsisten dan

komunikasi antar-tim yang terbatas menjadi tantangan. Penelitian ini memberikan rekomendasi untuk mengoptimalkan implementasi Scrum guna meningkatkan hasil proyek.

Kata Kunci: Agile, Manajemen Berbasis Bukti, Monitoring Tugas Karyawan, Pengembangan TI, Scrum.

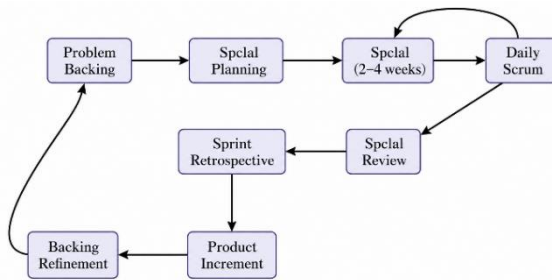
INTRODUCTION

The Agile methodology, particularly Scrum, has become popular in software development due to its ability to enhance collaboration, transparency, and efficiency. However, in the application development process, various challenges often arise, such as project completion delays, undocumented changes in user requirements, and a lack of communication among development teams (Taufiq, Raharjo, S Wahbi, 2020).

Therefore, an adaptive software development method capable of responding quickly to change is required. This study examines the implementation of Scrum within the IT development team at PT. Erajaya Swasembada Tbk, a leading telecommunications distributor in Indonesia. The research aims to evaluate the effectiveness of Scrum in developing an employee task monitoring application, identify the factors influencing its success, and propose improvements based on EBM metrics (Saiyad, n.d.).

The effectiveness of Scrum implementation in this project will be analyzed using the Evidence-Based Management (EBM) approach, which focuses on four key metrics: Employee Satisfaction, Lead Time, Velocity, and Innovation Rate. These four metrics were chosen because they provide a comprehensive overview of Scrum team

performance, covering individual satisfaction, process efficiency, consistency in work pace, and innovation capability.



Source: (Research Results, 2026)

Figure 1. Scrum Stages

By applying EBM as an evaluation framework, this study aims to obtain an objective and measurable understanding of the extent to which Scrum contributes to project success, as well as the factors that influence its implementation effectiveness (Putri S Fatichah, 2023). Scrum is an Agile framework that emphasizes iterative development through structured activities such as sprint planning, daily stand-ups, and retrospectives (Sravan, Vuyyuru, Gottapu, Theeda, S Peddineni, 2024). A visualization of these stages is presented in Figure 1. The Agile Manifesto prioritizes individuals, interactions, and adaptability, which Scrum operationalizes through roles such as Scrum Master, Product Owner, and Developer (Schwaber S Sutherland, 2020). Evidence-Based Management (EBM) provides a data-driven approach to evaluate team performance through four metrics: Employee Satisfaction, Lead Time, Velocity, and Innovation Rate.

Unlike previous Scrum studies that mainly focus on generic software development environments, this study specifically investigates Scrum implementation in the development of an Employee Task Monitoring application within a large-scale telecommunications distribution company. The study also highlights practical challenges such as inconsistent retrospective practices and inter-team communication silos in enterprise-scale operations. Previous studies generally focused on Scrum implementation in startup environments or small-scale software projects. In contrast, this research examines Scrum implementation within a large-scale telecommunications distribution company that involves cross-functional coordination, operational dependency, and enterprise-level project management complexity. This context creates unique challenges, particularly related to inconsistent Scrum practices and communication silos between development teams.

MATERIALS AND METHODS

This study employs a mixed-methods approach, combining both qualitative and quantitative methods. Data collection includes:

Observation: Direct observation of Scrum practices (e.g., product backlog management, daily stand-ups, sprint reviews) to assess adherence to Scrum principles.

Interviews and Surveys: Semi-structured interviews with 45 respondents (from a total of 80 IT team members), consisting of developers, testers, analysts, and Scrum Masters. A 1–5 rating scale was used to measure perceptions of Scrum’s effectiveness. The sample size was determined using the Slovin formula, resulting in a margin of error of 9.86%.

Documentation: Analysis of secondary data such as sprint backlogs, burndown charts, and velocity charts.

Once the data was properly collected and organized, the analysis stage became crucial for evaluating Scrum implementation effectiveness (Cynthia Chizoba Ekechi, Chukwuekem David Okeke, S Henry Ejiga Adama, 2024). The researcher analyzed the data using a qualitative descriptive approach combined with quantitative elements. The analysis focused on data from interviews, observations, questionnaires, and documentation, through the stages of data presentation and data reduction. Quantitative data, such as velocity metrics, were analyzed using descriptive statistics to strengthen qualitative findings.

Data reduction was carried out to filter relevant information from interviews, observations, surveys, and documentation, focusing on EBM metrics (Current Value, Unrealized Value, Time to Market, Ability to Innovate). Data presentation was structured by classifying it into themes such as Scrum Master role effectiveness, employee satisfaction, and release frequency, supported by tables and charts (Ozkan, Bal, Erdogan, S Gok, 2022).

Based on the preliminary study, the researcher formulated the problems related to the implementation of the **Scrum** method in the IT unit of PT Erajaya Swasembada Tbk, while also defining the objectives of the study. The research questions are as follows:

1. How effective is the Scrum method in improving the productivity of the IT team?
2. How is the quality of applications developed using Scrum, in terms of functionality and usability?
3. What are the supporting and inhibiting factors in the implementation of Scrum?

- How satisfied are the stakeholders with the results of Scrum implementation?

$$n = \frac{N}{1+N \cdot e^2} \quad (2)$$

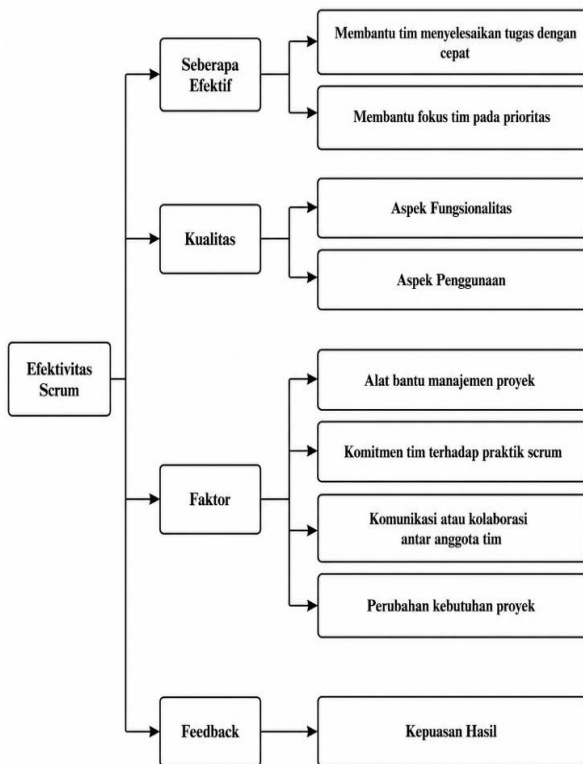
n = the minimum required sample size
 N = the total population (e.g., all employees in the Scrum team)
 e = the desired margin of error (e.g., 5% or 0.05)

$$\text{Margin Error} = e = \sqrt{\frac{N-n}{n \cdot N}} \quad (3)$$

$$e = \sqrt{\frac{80-45}{45 \cdot 80}} = \sqrt{\frac{35}{3600}} = \sqrt{0.009722} \approx 0.0986$$

Margin of error $\approx 0,0986$ atau 9,86%

The research framework was developed to identify the relationship between Scrum implementation practices and Evidence-Based Management (EBM) metrics in evaluating team productivity and project effectiveness.



Source: (Research Results, 2026)
 Figure 2. Mind Mapping

The formulation of these research questions was carried out using the Figure 2 of mind mapping method with *draw.io*, as illustrated in the following figure.

RESULTS AND DISCUSSION

The survey results indicate an average Employee Satisfaction score of 4.19 based on Table 1 and Table 2, reflecting overall satisfaction with Scrum implementation. However, one specific aspect of the question that related to the application of Scrum in a specific project has scored 3.92, suggesting suboptimal performance due to uneven workload distribution or insufficient managerial support (Budiman, Raharjo, S Suhanto, 2022).

Table 1. Employee Satisfaction

Employee Satisfaction	
Question 1	4,12
Question 2	4,34
Question 3	4,16
Question 4	4,16
Question 5	4,43
Question 6	4,14
Question 7	3,92
Total Average	4,19

Source: (Research Results, 2026)

Table 2. Satisfaction Rate

Satisfaction	Rate
Very Satisfied	>5
Satisfied	4-4,9
Moderate	3-3,9
Unsatisfied	2-2,9
Very Unsatisfied	1-1,9

Source: (Research Results, 2026)

In this study, the population (N) in the IT department of PT Erajaya was targeted at 80 employees. Based on the calculation using Slovin's formula with a population of 80 and a margin of error (e) of 10%, the minimum required number of respondents is 44. This study successfully collected 45 respondents, thereby meeting the minimum sample size requirement. Accordingly, the data obtained can be considered valid and representative of the population for the purpose of analysis.

$$n = \frac{80}{1+80(0.1)^2} = 44.44 = 45$$

With 45 respondents out of a total population of 80 employees, the survey's accuracy level was measured using Slovin's formula, resulting in a margin of error of 9.86%. This means there is a possible deviation of $\pm 9.86\%$ from the average score, indicating that the actual satisfaction score lies within the range of approximately 3.78 to 4.60. Nevertheless, the mean score still falls within the "Satisfied" category, leading to the conclusion that the implementation of Scrum has had a positive impact on employee satisfaction. Lead Time,

measured as the duration from task initiation to completion, averaged six days (June 13–20, 2025) based on Table 4 and Table 5, with a rate classification of 3 (5–7 days), indicating moderate efficiency. Opportunities for further improvement were identified.

Table 3. Lead Time Result

Lead Time	
Start Date	13/06/2025
End Date	20/06/2025
Total	6
Rate	3

Source: (Research Results, 2026)

Table 4. Day Rate

Day	Rate
< 2	5
2-4	4
5-7	3
8-10	2
>10	1

Source: (Research Results, 2026)

Table 5. Innovation Rate

Sprint Name	Story Point
PROD Sprint 2	8
PROD Sprint 3	3
PROD Sprint 5	1
PROD Sprint 6	2
PROD Sprint 7	2
Product Service 2024/11 - S1	2
Product Service 2024/11 - S2	1
Product Service 2024/11 - S7	4
Product Service 2024/11 - S9	6,5
Product Service 2024/11 - S11	12
Product Service 2024/11 - S13	4
Total	45,5
Total Story Point	451,5
Total Innovation Rate (%)	10,1%
Rate	3

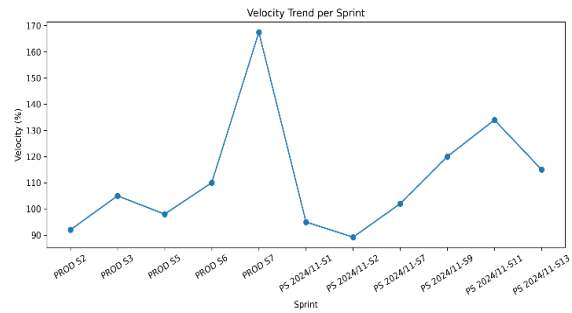
Source: (Research Results, 2026)

Table 6. Innovation Rate Score

Innovation Percentage / Sprint	Score
> 20%	5
15–20%	4
10–14%	3
5–9%	2
< 5%	1

Source: (Research Results, 2026)

An analysis of 11 sprints showed an average velocity of 45.54 story points, with some sprints (e.g., PROD Sprint 7 at 167.5%) exceeding the target, reflecting strong team capacity. However, variability was observed, with certain sprints underperforming (e.g., Product Service 2024/1 at 89.2%).

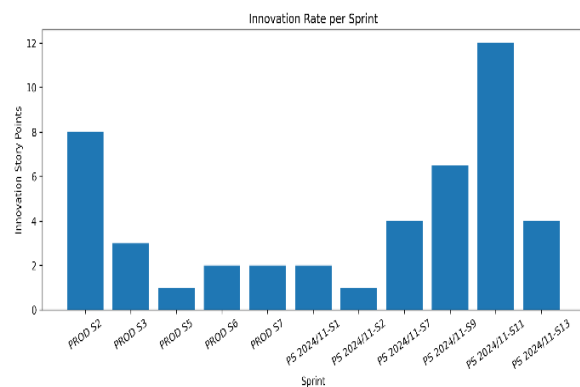


Source: (Research Results, 2026)

Figure 3. Velocity Trend-Sprint

Figure 3 illustrates the fluctuation of sprint velocity across 11 development sprints. Several sprints exceeded the planned target, particularly PROD Sprint 7, indicating strong team performance and workload capacity during the development process. However, some sprints achieved lower velocity results, reflecting inconsistencies in task completion and workload distribution. Overall, the trend demonstrates that Scrum implementation contributed positively to sprint productivity despite variations between iterations. The Employee Satisfaction (4.19) and Velocity (average of 45.54 points) reflect strong performance, while moderate Lead Time (6 days) and Innovation Rate (10.1%) indicate areas for improvement.

A simple descriptive relationship analysis indicates that higher sprint velocity was generally associated with higher employee satisfaction scores. Teams that consistently completed sprint targets reported better collaboration quality, clearer task allocation, and more effective communication during sprint execution. This finding suggests that stable sprint performance contributes positively to employee morale and overall Scrum effectiveness. Innovation Rate stood at 10.1%, classified as moderate (Rate 3) based on Table 6 and Table 7, suggesting room to enhance innovative contributions within sprints.



Source: (Research Results, 2026)

Figure 4. Innovation Rate-Sprint

Figure 4 presents the distribution of innovation story points across multiple sprints. The results indicate that innovation contributions varied significantly between iterations, with the highest innovation achievement recorded in Product Service 2024/11-S11. Although the overall innovation rate was categorized as moderate, the trend suggests that Scrum practices supported continuous improvement and encouraged incremental innovation throughout the development cycle. Inconsistent practices and communication silos emerged as the main challenges. Based on interview findings, several respondents reported that retrospective sessions were often skipped due to tight deadlines and operational priorities. One developer stated:

Table 7. Total EBM

EBM	Rate
Employee Satisfaction	4
Lead Time	3
Velocity	4
Innovation Rate	3
Total EBM	3,5

Source: (Research Results, 2026)

Table 8. Rate EBM

Rate	Description
4.5-5.0	Very Satisfied
3.5-4.4	Satisfied
2.5-3.4	Moderate
1.5-2.4	Unsatisfied
<1.5	Very Unsatisfied

Source: (Research Results, 2026)

“Sometimes retrospective meetings are postponed because the team focuses more on immediate delivery targets rather than evaluation sessions.” (Respondent D-12). Another respondent mentioned: “Communication between backend and QA teams is still fragmented, causing delays during issue validation.” (Respondent Q-07). The interview findings indicate that communication silos mainly occurred due to differences in work priorities between teams, the absence of integrated coordination schedules, and inconsistent participation during sprint retrospective sessions. In several cases, backend and quality assurance teams worked independently without continuous synchronization, resulting in delays during validation and deployment processes. Furthermore, retrospective meetings were often treated as secondary activities when project deadlines became tighter, reducing opportunities for evaluation and continuous improvement. Recommendations include:

1. Strengthening retrospective sessions to foster continuous improvement.
2. Enhancing Scrum role training to improve

commitment and role clarity.

3. Regular backlog updates to maintain clear priorities.
4. Improving cross-team collaboration through integrated communication platforms.
5. Conducting periodic EBM evaluations to monitor progress and visualize trends.

These strategies can raise EBM scores to the “Good” or “Very Good” category in future iterations (Sulaiman, Barton, S Blackburn, n.d.), optimizing Scrum’s impact on project outcomes. Overall, based on Table 8 and Table 9, the implementation of the Scrum framework within the company presents significant opportunities to improve team effectiveness (Masood, Hoda, S Blincoe, 2021), process transparency, and the value of delivered products. With a foundation built on collaboration, adaptability, and continuous inspection, Scrum is well-suited to address the challenges of an ever-evolving business landscape (Sinha S Das, 2021).

The success of its implementation, however, depends heavily on the commitment of all team members as well as organizational support in fostering a work culture that is open, accountable, and improvement-oriented. Therefore, sustaining Scrum practices should not merely be seen as a work method but as part of a cultural transformation that drives better performance in the future (Kumar Dora S Dubey). The findings reveal both supporting and inhibiting factors in Scrum implementation (Raicevic S Garvanov, 2023):

Supporting Factors:

1. Adherence to Scrum stages (e.g., sprint planning, daily stand-ups) maintained team rhythm.
2. Open communication and collaboration facilitated rapid problem-solving.
3. Backlog grooming and sprint planning improved prioritization focus. Regular feedback via sprint reviews supported continuous improvement.
4. Scrum artifacts (e.g., product backlog, sprint board) enhanced project transparency.

Inhibiting Factors:

1. Inconsistent retrospective sessions reduced reflective practices.
2. Lack of commitment to Scrum roles and principles caused delays.
3. Irregular backlog updates led to unclear work direction.
4. Communication barriers between teams hindered cross-functional collaboration.
5. Ambiguity in Scrum roles affected task distribution.

Overall, the survey by (Shahriary, Sedighi, Tajik, Shahinfar, S Asiyabar, 2025) findings suggest that Scrum has a positive impact on improving IT team productivity. Most respondents reported that Scrum facilitated better team coordination and strengthened intra-team communication. This was reflected in high scores for aspects such as improved performance, clarity in task distribution during sprints, and consistent daily stand-ups. Furthermore, sprint planning stages were seen as helping the team work more efficiently and purposefully, enabling faster task completion while avoiding unnecessary obstacles. Through sprint reviews and retrospectives, Scrum provided an evaluative mechanism that teams could leverage for improvement, although the outcomes largely depend on each member's commitment and consistency in applying it (Vega, Rodríguez, Rocha, S Dos Santos, 2022).

CONCLUSION

This study concludes that Scrum implementation positively contributes to improving team productivity, collaboration, and project transparency within PT. Erajaya Swasembada Tbk. The implementation of Scrum supported better sprint management, clearer task distribution, and more effective team coordination during application development processes. The evaluation using Evidence-Based Management (EBM) metrics indicates that employee satisfaction and sprint performance achieved positive results, although several aspects such as lead time efficiency and innovation rate still require improvement. The findings also reveal that communication barriers between teams and inconsistent retrospective practices remain challenges in maintaining optimal Scrum implementation. To enhance Scrum effectiveness, organizations should strengthen role commitment, maintain consistent backlog management, improve cross-team collaboration, and conduct periodic EBM evaluations. Future studies are recommended to apply broader statistical analysis and comparative evaluation across multiple projects or organizations to obtain more comprehensive findings regarding Scrum effectiveness in enterprise environments.

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