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Critical Factors to Improve Teamwork Quality in Indonesian Startups Using aTWQ Framework

Muhammad Ridwan Fathin[1], Teguh Raharjo[2]
[1,2]Magister of Information Technology, Computer Science, University of Indonesia, Jakarta, Indonesia
[1]muhammad.ridwan16@ui.ac.id, [2]teguhr2000@gmail.com

Abstract

Due to the ever-changing needs of IT in today's businesses, agile software development has become popular due to its adaptive capabilities. Startups are among those who continuously strive to meet changing needs. Despite the potential benefits of Agile methodology, teamwork quality remains a challenge. Moreover, the global recession has made it increasingly important for startups to have effective teamwork, given the high level of uncertainty that leads to challenges in surviving, especially with cost-cutting efforts and downsizing. Therefore, this study aims to evaluate teamwork quality in Indonesian startups using the Agile Teamwork Quality (aTWQ) approach. TWQ is a comprehensive set of criteria designed to assess teamwork quality in agile environments. The primary objective of this study is to identify the factors that most strongly increase the teamwork quality of Indonesian startups. To accomplish this objective, data will be gathered from Indonesian companies using an online survey based on the aTWQ framework. The challenges were identified most on the cohesion, balance of contribution, and effort dimensions. The findings of this study are consistent with previous research, which hopefully may assist startups in Indonesia to enhance their teamwork quality and achieve greater success in their respective industries.

Keywords: teamwork quality; agile; aTWQ; startup; teamwork quality factors

1. Introduction

The use of technology in the form of software has become an essential requirement for businesses in today's society. Agile software development is a popular approach that enables software providers to adapt to constantly changing technological needs [1], [2]. Startups are generally distinguished by their speed, flexibility, and willingness to take risks, which can result in the development of innovative goods and services that fulfill unmet market demands [3].

Even though the Agile methodology offers potential benefits, workgroup quality remains an issue [4], [5]. The global recession, which symbolizes tremendous uncertainty, will make it difficult for new businesses to survive and thrive [1], [6]. In this setting, the quality of cooperation may have a substantial impact on a startup's performance and success. Project management implementation in IT projects is becoming increasingly significant in Indonesia, and there is a need to identify crucial success criteria that may help firms improve their project management processes [7]. These practices include teamwork as part of project management.

The Agile method emphasizes iterative and incremental development, team collaboration, and continuous delivery [8]. One of the Indonesian startups recorded that the project completion rate in the last six months is 67.2% compared to the initial completion target. Based on the [3], the four main issues of the agile product development process are the importance of self-organizing teams over workloads, communication, and collaboration between team members, practitioners, and users to recognize change as an opportunity. It also emphasizes software that is delivered quickly and satisfies users' needs.

According to [9], an agile strategy can lead to improved project outcomes. Organizations encounter a variety of obstacles, including cultural differences, a lack of experience, and poor communication, all of which can affect team quality. Product development frequently takes precedence over cooperation inside firms, which can result in poor collaboration.

Teamwork quality (TWQ) is an essential component in software development since it impacts the ultimate product's quality [9], [10]. Many studies have found

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characteristics that impact the quality of software development teamwork [9], [11]. Effective teamwork is crucial in agile contexts to ensure that the team produces high-quality software products on time and within budget. A study by [9] found that communication, cooperation, trust, leadership, knowledge, redundancy, and flexibility are critical variables in achieving high-quality teamwork in agile projects.

Another study by [10] found that TWQ is a crucial element in improving team performance, particularly the quality of the product that results. They also discovered that TWQ had a very favorable influence on team member's learning and work satisfaction. The necessity of quality and effective cooperation in agile projects cannot be overstated, since a lack of teamwork may lead to product development delays, missed deadlines, and quality concerns, all of which can risk a startup's profitability [5]. Good teamwork quality is important because it can lead to better outcomes for team projects, as well as improved learning outcomes for individual team members.

Another study by [12] found some factors related to teamwork quality, such as team attitude, empathy, good interaction management, good communication style, cooperation, quick responses to complaints or misunderstandings, openness, agreeableness, and trust amongst project teams [13]. Having a competent and skilled team is important for successful project management office implementation, which is a unit responsible for providing support for project implementations and supporting project managers to achieve project goals by providing standard processes and project management methodologies [7].

The purpose of this research is to assess the quality of teamwork in Indonesian startups. With the prevalent use of Agile methodologies in Indonesian startups and persistent concerns about teamwork quality, there exists a research gap that this study seeks to fill. Unlike previous studies, this research specifically focuses on the unique context of Indonesian startups and investigates the factors that contribute to teamwork quality within this setting. By conducting an online survey and assessing adherence to the aTWQ framework, the study aims to shed light on the critical factors that enhance collaboration and improve teamwork quality. This research holds importance as it not only addresses the specific needs and challenges faced by Indonesian startups but also contributes to the advancement of knowledge in teamwork quality. By recognizing the existing research gap and offering insights tailored to the Indonesian startup ecosystem, this study provides valuable information to support effective collaboration strategies and foster success in this dynamic business environment [14].

2. Research Methods

The research methodology consists of several steps that must be completed to answer the research question (RQ). The research question of the paper is "What are the critical factors for improving teamwork quality in Indonesian startups using the Agile Teamwork Quality (aTWQ) framework?". This RQ will lead the research to discover the critical factors that might improve teamwork quality in Indonesian startups based on the aTWQ framework.

2.1 Literature study

This section will explain some terms used in this research, which are agile project management, TWQ, and aTWQ framework.

Agile project management is a methodology that allows software engineers to swiftly adjust to changing technological needs by following the agile manifesto[1]. Project management is the practice of planning, organizing, and managing resources to achieve certain goals within a specified period [15]. Project management is a principles-based approach that emphasizes delivering value to stakeholders, adapting approaches to project contexts, fostering collaboration and teamwork, producing quality results, proactively identifying and managing risks, managing change effectively, establishing effective communication channels with stakeholders, engaging stakeholders throughout the project life cycle, and leveraging appropriate project management tools, according to the PMBOK 7th Edition [16].

Teamwork quality refers to how well a group of individuals collaborates and works together to achieve common objectives. A high-quality team is a group of people who work well together to achieve a common goal. While many factors contribute to high-performing project teams, the PMBOK 7 emphasizes several key factors. These include open communication, which fosters productive interactions and collaboration; shared understanding, ensuring all team members grasp project goals; shared ownership, encouraging responsibility and motivation; trust, essential for investing extra effort; collaboration, generating diverse ideas and better results; adaptability, enabling effective adjustments; endurance, showcasing resilience; empowerment, allowing decision-making and improved performance; and recognition, acknowledging hard work and encouraging ongoing excellence [16].

Agile Team Work Quality (aTWQ) approach is a comprehensive set of criteria designed to assess teamwork quality in agile environments [1] [9]. This framework is meant to be adaptable to various Agile processes and team configurations. Previous research has shown that the aTWQ framework is a useful method for detecting team traits, research by [9] for example, used the aTWQ approach to evaluate cooperation

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quality in Agile software development teams. Their research discovered a link between TWQ and team performance, with benefits to team member satisfaction and learning. As a result, improving team performance, and particularly team product quality, requires improving collaboration quality. Future research should focus on validating the TWQ design and developing team performance metrics to improve team performance. Furthermore, as demonstrated by [17], who used the aTWQ framework to assess the quality of cooperation in various Agile teams participating in software development, the aTWQ framework can assess the quality of teamwork within several Agile teams in a large corporation.

2.2 Research Design

The quantitative data will be used in the research methodology. Figure 1 depicts the research flow, which encompasses various activities and methods. The initial step of defining the research topics and selecting appropriate research instruments was presented in the introduction chapter. On the other hand, the conclusion chapter is dedicated to formulating conclusions and recommendations based on the study's findings. The data collection and analysis will be detailed in Figure 1.

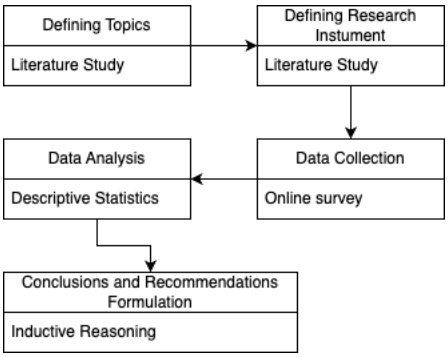

Figure 1 Research Flow

2.3 Data Collection

Participants in our study required a team to have implemented agile methodology for at least one year and delivered software to a customer at least once. The aTWQ approach consists of six dimensions: communication, coordination, effort, cohesion, and balance of contribution [9]. These dimensions are considered to be equally important and interrelated components of effective teamwork. Each dimension contributes to the overall quality of teamwork, and deficiencies in any one dimension can negatively impact the effectiveness of the team as a whole. So a one-way ANOVA is used to test the hypothesis that the means of two or more groups are equal [18], [19]. One-way ANOVA is an appropriate statistical test to determine if there are any significant differences between the means of the groups within each variable. This will help determine the overall effectiveness of the questionnaire and identify any specific areas that need improvement. Based on [18], we can calculate the minimum sample in several steps.

First, identify the number of variables: there are six variables, representing the six dimensions of aTWQ. Second, identify the number of variables: there are six variables, representing the six dimensions of aTWQ. Third, determine the effect size: The effect size is medium (0.5), which is the usual measure of the strength of the relationship between factors and the overall quality of teamwork in this case. Fourth, decide on the desired power: The desired power is 0.80, which is a commonly used value in statistical analysis. It means that we want the probability of correctly detecting a true effect (i.e., not making a Type II error) to be 80%. Fifth, set the significance level: The significance level is 0.05. This means that if we reject the null hypothesis, we are willing to accept a 5% chance that we are wrong. The null hypothesis, in this case, is that "there is no significant relationship between the six dimensions of the aTWQ questionnaire and the teamwork quality among Indonesian startups". Finally, calculate the sample size: Using a statistical calculator such as G*Power, the total sample size recommended is 60, as shown in Figure 2.

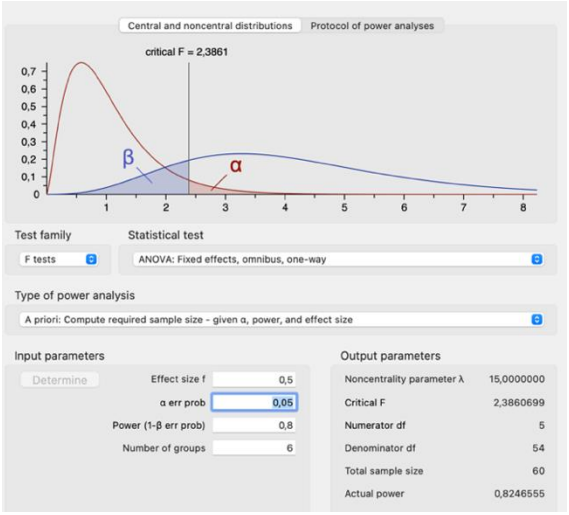

Figure 2. Sample size by G*Power statistical calculator

The sampling technique will be a stratified random sampling technique. The population will be stratified by industry type, and a random sample of startups will be selected. As an ethical consideration, participants will be informed about the purpose of the study and their rights as participants. The information obtained will remain confidential and be utilized for research purposes only.

2.4 Data Analysis

The questionnaire will have 38 questions with answers on a 5-point scale, where 1 represents "strongly disagree" and 5 represents "strongly agree". Analyzing survey results with a Likert scale involves calculating

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descriptive statistics such as mean, mode, and standard deviation [20]. The mean is the average value of a set of numbers; it is a useful measure of central tendency because it provides a representative value for the entire dataset.

The mode represents the most frequently found value in a group of data. It is useful to describe the most typical response. The standard deviation measures the amount of variation or spread in a set of data. The standard deviation is useful for understanding how tightly clustered or spread out the values are in a dataset. After that, we elaborate on each dimension based on reference and sort by the most critical factors to improve based on the lowest score result.

3. Results and Discussions

3.1 Results

The sample consisted of 60 participants from various Indonesian startups. Figure 3 presents the variance of experience in implementing agile in their teams. Figure 4 presents the variance in the position and role of the participant.

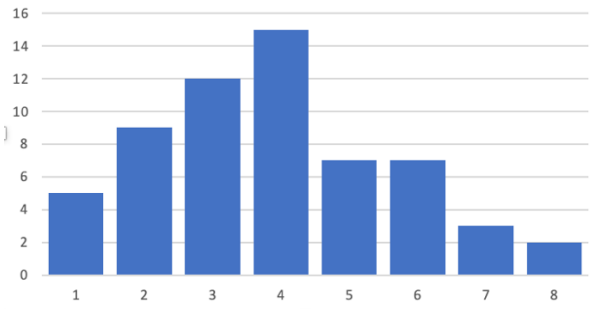

Figure 3. Participant experience in implementing agile

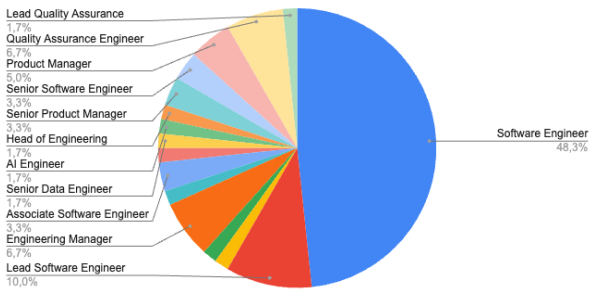

Figure 4. Participant's current position/role

Table 1 presents descriptive statistics for the six dimensions of the Agile Teamwork Quality (aTWQ) approach and the overall quality of teamwork.

In this paper, we utilize Mean, Mode, and Standard Deviation as statistical measures to analyze and interpret the data about teamwork quality within Indonesian startups.

Mean(Average), is a key indicator of trend. In the context of our study, the mean serves as an important measure of the central trend or usual level of cooperation quality as judged by our 60 participants from different Indonesian startups.

Table 1. Descriptive Statistics for the Dimensions of the aTWQ Approach and the Overall Quality of Teamwork

Dimension	Mean	Mode	Standard Deviation
Communication	3,68	4	0,91
Coordination	3,67	4	0,95
Mutual Support	4,03	4	0,69
Effort	3,63	4	0,91
Cohesion	3,56	4	1,04
Balance of Contribution	3,62	4	0,89
Overall Quality	3,67	4	0,93

Mode is the value that shows up the most often in a dataset. The mode is the rating that participants gave most frequently for each dimension assessed in our study. This data sheds light on the particular features of each category that participants valued highly or often when rating the level of collaboration.

The standard deviation measures how widely apart data points are from the mean, or how variable they are. In this study, the standard deviation values for each dimension are used to evaluate the consistency of participant evaluations. While bigger values indicate greater variety among participant assessments, smaller values signal that participant ratings are more consistent and tightly grouped around the mean.

In this case, the mode for each dimension is 4, which means that 4 is the most common rating given by participants for each dimension. The standard deviation for each dimension in this case ranges from 0.69 to 1.04, indicating that the ratings for each dimension are reasonably close to the mean and that participants are more consistent and have roughly the same ratings.

The authors obtained useful insights into the outcomes for each dimension by evaluating the elements in the references. To offer a clearer view of which elements require extra improvement, the findings are then sorted by score, from most critical to least crucial based on the mean score. The mean score then To ease the presentation, we try to use different words, as a mean is the average of the participant's answers in a domain, while an average is the average of all domains' mean scores.

The lowest mean score is in the cohesion domain, with a value of 3.56, which is low compared to the average and shows room for development. Although team members are genuinely devoted to the team, personal disputes and imbalances in member contributions have resulted in team conflict. This dimension may be improved by concentrating on personal concerns and ensuring that each team member feels accountable for the team's development and sustainability.

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The second-lowest score is the balance of the contribution domain. The mean score for a balance of contributions within the team is 3.62, which is below average, indicating the need for improvement. To improve the score for the balance of contribution, recognizing and utilizing the specific strengths and weaknesses of each team member and ensuring a fair distribution of tasks and responsibilities may be necessary.

The next lowest score is in the effort domain. The mean score for effort is 3.63, which is below average, indicating a need for improvement. While every team member prioritizes teamwork, conflicts regarding member effort have arisen. To improve effort, the team should resolve conflicts regarding effort and ensure that all team members put in an equal amount of effort.

The mean score for coordination is 3.67, which is the central tendency of a value indicating a need for improvement with a lower priority. While work on subtasks within the team is closely synchronized, conflicts regarding subtask goals and conflicting interests have arisen. To improve coordination, the team should set clear and fully comprehended goals for subtasks that are accepted by all team members and resolve conflicts regarding subtask goals and interests.

The mean score for the communication domain is 3.68, which is higher than the norm, indicating that there is space for development with a lower priority. Although team members often communicate, conflicts have emerged over the open flow of information, and certain vital information is not shared with all team members. To increase communication, teams must freely communicate important thoughts and information about teamwork, settle issues over information flow, and guarantee that all team members get timely, suitable, and helpful information.

The mean score for the mutual support domain is 4.03, which is the highest score, indicating the strength of the team. The team members help and support each other, and conflicts are easily and quickly resolved. The team cooperates well and can reach a consensus regarding important issues. To maintain and improve mutual support, the team should continue to encourage constructive discussions and controversies, show respect, and further develop the suggestions and contributions of all team members.

Overall, the results suggest that the team has strengths in certain areas but also has room for improvement in others. By focusing on the specific areas that need improvement, the team can work towards raising their overall teamwork quality and achieving greater success.

3.2 Discussions

The findings of this study provide insights into the critical factors that can improve teamwork quality in Indonesian startups using the Agile Teamwork Quality (aTWQ) framework. The results show that the dimensions of effort, cohesion, and balance of contributions are the critical factors that could potentially improve the overall teamwork quality of the startups. To derive the suggestions, we attempt to employ inductive reasoning based on the areas [8] and the characteristics of high-performing teams in PMBOK 7 [16].

To improve effort scores, resolving conflicts regarding member effort and ensuring that all team members put in an equal amount of effort may be necessary. To improve cohesion scores, resolving personal conflicts and ensuring that all team members feel equally responsible for maintaining and protecting the team may be beneficial. To improve the balance of contribution scores, recognizing and utilizing the specific strengths and weaknesses of each team member and ensuring a fair distribution of tasks and responsibilities may be necessary.

The findings of this study are in alignment with prior research, emphasizing the significance of mutual trust and team culture as pivotal determinants influencing the quality of teamwork. This corroborates the findings of our research, particularly within the context of the cohesion dimension. Furthermore, it similarly underscores the vital role of adequate technical and skill training in enhancing teamwork quality, which corresponds to the dimension of effort. Illustrative activities aimed at improvement include the establishment of transparent, open, and honest communication channels among team members, which serve to mitigate misunderstandings and fortify collaborative efforts [21]. Additionally, defining each team member's scope and responsibilities based on their respective roles and strengths can substantially enhance teamwork, mitigate conflict, and optimize team efficiency. The provision of regular performance feedback emerges as another critical practice, serving to nurture trust, reinforce individual accountability, and pinpoint areas necessitating additional support or training. Lastly, fostering a culture of collaboration and knowledge sharing within the team environment creates an atmosphere where team members are incentivized to collaborate and exchange expertise. This, in turn, not only bolsters cooperation but also stimulates innovation, culminating in enhanced overall team performance and results.

However, certain limitations of this study, such as the relatively small sample size and self-reported survey data, may bring bias or inaccuracy to the results. These limitations imply that more research with bigger sample sizes and more diversified techniques is required to fully understand the essential elements influencing the quality of cooperation in Indonesian startups.

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Overall, the results of this study suggest that improving Communication, Coordination, Effort, Cohesion, and Balance of Contribution can lead to better teamwork quality in Indonesian startups using the Agile Teamwork Quality (aTWQ) framework. The insights provided by this study can help startups in Indonesia to improve their teamwork quality and achieve greater success in their respective industries.

4. Conclusion

In conclusion, this research has contributed to the understanding and recommendation for the improvement of teamwork quality in Indonesian startups through the utilization of the Agile Teamwork Quality (aTWQ) framework. The study's findings try to provide valuable insights into the critical factors influencing overall teamwork quality, specifically communication, coordination, effort, cohesion, and balance of contribution. The dimensions of cohesion, balance of contribution, and effort have been identified as areas presenting notable challenges, indicating the need for targeted improvement.

Drawing from the results, this study offers practical contributions by offering actionable recommendations to address the identified challenges. Proposed measures include conflict resolution, fostering mutual trust, ensuring equitable distribution of effort and responsibilities, and recognizing individual strengths and weaknesses. Implementing these strategies is crucial to fostering cohesion and cultivating a positive team environment.

Additionally, this research underscores the significance of technical and skills training as a key business factor that contributes to improved teamwork quality. By equipping team members with the necessary knowledge and capabilities, startups can enhance their overall performance and productivity.

Overall, the findings of this study provide valuable guidance to startups in Indonesia, empowering them to enhance their teamwork quality and thrive in their respective industries. By explicitly addressing the research questions and emphasizing the contributions made based on the results, this study offers insightful implications for both academic research and practical application, supporting effective collaboration and success within the dynamic startup environment.

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