Factors Affecting Success of Team Members in Indonesia Scrum Implementation

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Abstract: The Indonesian government continues to encourage the community to build start-up. Various training and assistance programs are published to educate the community of the software development concept. One of the most popular concepts in Indonesia is the Scrum methodology. This methodology can rapidly generate a product and easily adjust to the market needs. However, Scrum, as a method that implements the Agile concept, has a high failure degree. Agile implementation failure is caused by human unreadiness; therefore, studies have generated factors affecting the success of Agile implementation team members. However, factors affecting the success of Scrum team members remain unknown. Therefore, this study aimed to discover factors affecting the success of Scrum team members in Indonesia. The Structured Equation Model (SEM) was utilized to discover the correlation between teamwork quality and Scrum team success. The SEM method was selected based on its ability to reveal the significance between supporting variables. Analysis results show that factors significantly affecting Scrum team member success were Balance of Member Contribution, Effort, and Cohesion. The analysis test results show that endogenous latent variables between TWQ and the success of Scrum team members had a sufficient value equal to an R-squared value of 0.732 or 73.2%.

1 INTRODUCTION

The Indonesian government encourages startups to develop each year. Based on the Technology Creative Industrial Community data, the number of developing startups in Indonesia reached 992 in 2018 (Kominfo, 2019b). This number will continue to increase along with various startup incubation programs launched by various ministries, e.g., Kominfo (Kominfo, 2019a), Kemenparekraf (Kemenparekraf, 2021), Ristekbrin (Ristekbrin, 2021), and other ministries and institutions. These development programs involve experienced academics and practitioners to teach startup development methods. One development method using the agile concept is the Scrums method (DailySocial, 2015). This method is perceived to meet startup product development needs in Indonesia (DailySocial, 2015).

Rapid delivery characteristic in agile puts this method be globally popularized (Mersino, 2018). It is supported by dynamic and rapidly changing technological advances. Feedback comes faster to software developers depending on small-scale product delivery and rapid delivery time (Project Management Institute, 2018). It is an appeal for developers to implement agility.

Regardless of improvement in agile method utilization, its implementation often experiences failure. Based on the Version One survey in 2018, the primary reasons for agile approach failure are 1) lack of knowledge on the agile method by 41%, 2) lack of training program to implement agility by 35%, and 3) lack of management and leader support by 42% (VersionOne, 2018). These three problems demonstrate human resource unreadiness to implement the agile concept. Nevertheless, in the agile manifesto, a team as the human component is a crucial element constituting the agile principle (Beck et al., 2001; Project Management Institute, 2018).

One of the agile manifesto principles shows that the best design, architecture, and requirements are achieved by the team capable of managing themself (Project Management Institute, 2018). A self-managed team is defined as the best method to implement project management, where they work without commands from external parties

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(ScrumGuide.org, 2015). The team is required to self-accommodate software development requirements (Schwaber & Sutherland, 2017). Based on this explanation, it can be concluded that agility implementation depends on each team member's success to build a product on each iteration. Success here is defined as the success in learning novel things and implement them in practice, ultimately giving pleasure to the product (Hoegl & Gemuenden, 2001).

Several precedent studies demonstrated the importance of teamwork quality on the success of a traditional software development project (Hoegl & Gemuenden, 2001; Li et al., 2010; Ryan & O'Connor, 2009). Then, in 2016, Lindsjorn conducted a study regarding the effect of teamwork quality on development using the agile concept (Lindsjørn et al., 2016). However, studies concerning agility specific to particular methods, e.g., Scrums, are unavailable. Therefore, this study aimed to discover factors influencing team members' success on the Scrums development project in Indonesia.

The teamwork quality (TWQ) concept is applied to measure team member collaboration in achieving success (Hoegl & Gemuenden, 2001). The employed analysis method was the Structural Equation Model (SEM) technique. This method can show the significance level between variables and explain whether a variable is accepted or rejected (Haryono, 2014). Factor analysis results can be used as recommendations for Scrums users and the government to provide startup incubation training to achieve product development success. This study's urgency is to provide knowledge regarding team success factors on Scrums software development to reduce the existing failure risk.

2 LITERATURE STUDY

2.1 Scrums Team

The Scrums team consists of the product owner, development team, and scrum master (ScrumGuide.org, 2015). The Scrums team is 1) self-managed, where the team manages themself without external party involvement, and 2) cross-function, where the team has all expertise required to finish their jobs (Scrumguide.org, 2015). Based on Scrum Guide, this composition can maximize team creativity, flexibility, and productivity.

2.2 Team Member's Success

Team members have declared success when they can improve member motivation in working with team member combinations to achieve sustainable project success (Lindsjørn et al., 2016). There are two dimensions used to measure team success, i.e., work satisfaction and learning (Batista et al., 2020; Hoegl & Gemuenden, 2001; Lindsjørn et al., 2016). Work satisfaction is the feeling of channeling happiness during teamwork (Lindsjørn et al., 2016). Meanwhile, learning is the opportunity to achieve social, technical, and managerial knowledge during team interaction.

2.3 Teamwork Quality (TWQ)

Teamwork quality (TWQ) is the quality assessment that observes the relationship among team members (Hoegl & Gemuenden, 2001). TWQ is developed by Hoegl and Gemunden. This concept is primarily employed in the academic aspect (Batista et al., 2020). TWQ has six dimensions, i.e., communication, coordination, the balance of member contribution, mutual support, effort, and cohesion. The following is the explanation of these six dimensions.

Communication: relates to formalization, intensity, and openness in information exchange (Lindsjørn et al., 2016). In the agile concept, communication is semi-formal, spontaneous, unscheduled, and takes form in direct conversation (Lindsjørn et al., 2016).

Coordination: relates to the shared understanding regarding each member's interrelated contribution (Hoegl & Gemuenden, 2001). Agreement on work structure, schedule, budget, work results, and general understanding when working on structural tasks are shared understanding (Lindsjørn et al., 2016). On the agile concept, coordination is conducted quickly and supported by the board of tasks.

Balance of Member Contribution: is concerned with contributions that reflect the experience and special knowledge of team members. The ability to apply the skills of all team members to the fullest (Lindsjørn et al., 2016). On the agile concept, each member constitutes a cross-function team, where each member should contribute.

Mutual Support: relates to each member's willingness and ability to support and help to work on tasks (Lindsjørn et al., 2016). On the agile concept, the existence of collective code ownership, daily

meetings, and retrospective meetings sparked a desire for mutual support and collaboration (Lindsjørn et al., 2016).

Effort: relates to team members' willingness and ability to prioritize team tasks over personal tasks and share the workload (Lindsjørn et al., 2016). On the agile concept, the team focus is mainly on the tasks that must be completed each day to achieve the sprint goals.

Cohesion: relates to the encouragement of team members to accept team goals as more important than individual goals and the drive to maintain the team's integrity (Lindsjørn et al., 2016). On the agile concept, focus on interactions among team members, who most often interact physically are placed in the same place (Lindsjørn et al., 2016).

2.4 Structural Equation Model (SEM)

Structural Equation Model (SEM) is a structural analysis to confirm parameters or variables (Lindsjørn et al., 2016). SEM application is used to analyze the relationship between the TWQ components that affect team members' success. Moreover, SEM is selected because this technique further develops regression analysis and path analysis (Haryono, 2014).

There are 2 main stages in SEM measurement:

1. Outer Model measurement to test the validity and reliability of the construct. This is to ensure that the construct is well defined. This can be seen from 1) the value of all loading factors > 0.7 and AVE (Average Variance Extract) > 0.5 for the validity test, and 2) the value of composite reliability and Cronbach's alpha > 0.70 for the reliability test (Hair et al., 2011).
2. Inner Model measurement to test the acceptance or rejection of the hypothesis. There are two criteria that need to be considered 1) the t-statistics (t) and p-values (p) test to assess the significance and acceptance of the hypothesis shows in the Table 1, and 2) the R Square test to assess the quality of the research model (Hair et al., 2011).

Table 1: Hypothesis Acceptance Parameters.

t-statistics	p-value	Significance Level
> 1.65	< 0.01	10%
> 1.96	< 0.05	5%
> 2.58	< 0.01	1%

3 HYPOTHESIS DEVELOPMENT

The previous explanation shows that the Teamwork Quality (TWQ) concept, theoretical review regarding Scrums team, and team member success were fit to be applied in this study. Thus, the thought framework replicates Hoegl's (2001). Table 2 shows the hypothesis obtained from this concept.

Table 2: Research Hypothesis.

Code	Hypothesis	References
H1	Balance of Member Contribution is positively correlated with Team Member's Success.	(Hoegl & Gemuenden, 2001; Lindsjørn et al., 2016; Mither et al., 1996; Satria et al., 2018)
H2	Cohesion is positively correlated with Team Member's Success.	
H3	Communication is positively correlated with Team Member's Success.	
H4	Coordination is positively correlated with Team Member's Success.	
H5	Effort has a positive correlation with Team Member's Success.	
H6	Mutual Support is positively correlated with Team Member's Success.	

4 METHODOLOGY

The classification in this study referred to the case study research strategy. The case study method is a method that involves researching a phenomenon (case) within a certain time (Saunders, M. Lewis, P. and Thornhill, 2016). Meanwhile, the study approach applied the quantitative approach with the Structural Equation Model - Partial Least Squares (SEM-PLS) method. This approach applies experiments with surveys or questionnaires using positivism statements (based on data) to test a theory (Creswell, 2013). Respondents were obtained using the purposive sampling technique (Etikan, 2017; Valerio et al., 2016). This technique is used based on the consideration that the respondent can answer the research statement and fulfill the expected objectives (Saunders, M. Lewis, P. and Thornhill, 2016). Purposive sampling is often used in small samples, e.g., case studies that tend to have specific respondents (Neuman, 2011). The minimum respondent number of applying Smart-PLS is 30 people (Zuhdi et al., 2016).

5 RESULT AND DISCUSSION

The collected data consists of 75 respondents. Respondents were people applying the Scrums Development Project. Respondents could act as the product owner, Scrum master, and developer. The following is respondent demography.

Table 3: Respondent Demographics.

Criteria	Information	Percentage
Gender	Female	38.7
	Male	61.3%
Age	20 – 25 Years	77.3%
	26 – 32 Years	33.7 %
Education	Diploma	1.3%
	Bachelor	86.7%
	Master	12%
Experience with Scrum	< 1 Year	66.7%
	1- 5 Years	33.3%
Position	Product Owner	21.3%
	Scrum Master	10.7%
	Developer	68%

5.1 Result

The results of data collection are then processed automatically with Smart-PLS tools. The first stage is Outer Model Measurement. The Table 4 shows that the constructs have well-defined (based on the value of the loading factors, composite reliability, and Cronbach's alpha > 0.70).

Table 4: The Result of Outer Model Measurement.

Variable and Indicators	Loading Factor	AVE	Result
1. Balance of Member Contribution			
Balance of team members' contributions.	0.891	0.774	Valid
The character of team members related to weaknesses and strengths.	0.868		Valid
Alpha Cronbach=0.708 *& Composite Reliability*=0.872			Reliable
2. Cohesion			
The importance of teamwork.	0.838	0.648	Valid
The importance of being part of a team.	0.797		Valid
Team excellence.	0.728		Valid
Bond between team members.	0.776		
Integration between team members.	0.837		Valid
The level of conflict that occurs in the team.	0.848		Valid
Alpha Cronbach=0.891 & Composite Reliability=0.917			Reliable
3. Communication			
Openness of information flow.	0.916	0.808	Valid
Accuracy in receiving information.	0.898		Valid
Timeliness in receiving information.	0.882		Valid
Alpha Cronbach=0.884 & Composite Reliability=0.926			Reliable
4. Coordination			
Sub-task objectives are accepted by all team members.	0.845	0.681	Valid
The goals are clearly understood by each member.	0.863		Valid
The level of conflict regarding the tasks received by the team is minimum.	0.764		Valid
Alpha Cronbach=0.765 & Composite Reliability=0.864			Reliable
5. Effort			
The team tries hard in teamwork.	0.884	0.789	Valid
Every team member encourages full teamwork.	0.901		Valid
Every team member makes teamwork their highest priority.	0.880		Valid
Alpha Cronbach=0.867 & Composite Reliability=0.918			Reliable
6. Mutual Support			
Team members help and support each other.	0.762	0.668	Valid
If conflicts arise, they easily and quickly resolve problems.	0.800		Valid
Team members' suggestions and contributions are respected.	0.885		Valid
Alpha Cronbach=0.750 & Composite Reliability=0.857			Reliable
7. Team Member's Success			
Comfortable with their jobs.	0.832	0.704	Valid
Happy with their work.	0.852		Valid
Get the benefits of working collaboratively.	0.839		Valid
Support a collaborative way of working.	0.834		Valid
Happy with the composition of the team.	0.919		Valid
Acquire important knowledge.	0.842		Valid
Teamwork promotes a person personally.	0.851		Valid
Teamwork shows the professional level of the team.	0.732		Valid
Alpha Cronbach=0.939 & Composite Reliability=0.950			Reliable

The second stage is the Inner Model Measurement with the following results.

Significantly Affecting Variables. The results of data processing with Smart-PLS show that three hypotheses are accepted (based on the criteria in the sub-chapter 2.4). These variables are balance of member contribution (H1, t= 2.836, $p < 0.01$ the significant level is 1%), cohesion (H2, t=2.078, $p < 0.05$ the significant level is 5%), and effort (H5, 5% -> t=2.130, $p < 0.05$ the significant level is 5%).

Non-affecting Variables. The following hypothesis is rejected because it does not meet the hypothesis acceptance rules discussed in the sub-chapter 2.4. These variables are communication (H3, t=0.245, $p > 0.1$), coordination (H4, t=0.604, $p > 0.1$), and mutual support (H6, t=1.090, $p > 0.1$). The three hypotheses show that the number of t (t-statistic) is less than 1.65 and the p (p-value) is more than 0.1. The PLS-SEM

test results in this study are summarized in Table 5. The red color indicates that the hypothesis is rejected.

R-squared Value Results of the Structural Model. The Smart-PLS test results show that the relationship between endogenous latent variables of TWQ and the success of the Scrums team members was sufficient or moderate (Hair et al., 2011). It was based on the R-Square ranged between 0.50-0.75, i.e., 0.732 or 73.2%. These results indicate an influential relationship.

Table 5: Hypothesis Test Results.

Hypothesis Code	Original Sample	T-Statistic (t)	P-Value (p)
H1	0.241	2.836	0.005
H2	0.353	2.078	0.038
H3	0.026	0.245	0.807
H4	0.069	0.604	0.546
H5	0.183	2.130	0.034
H6	0.150	1.090	0.276

5.2 Research Discussion

Several factors were influencing the success of Scrums team members in Indonesia. These factors are (1) balance of contribution, (2) cohesion, and effort. The factor with the greatest influence was cohesion among other factors.

The cohesion factor had a significant effect on the success of team members in Scrums. It follows the previous study (Lindsjørn et al., 2016). It can be triggered by the nature of Scrums which always emphasizes achieving goals in each iteration. Achieving goals will provide satisfaction and learning for the team to apply to the next sprint.

The effort factor was the second-leading factor influencing the success of Scrums team members. It is supported by the precedent studies (Lindsjørn et al., 2016; Satria et al., 2018). The effort also emphasizes completing tasks based on priorities in the product backlog (Lindsjørn et al., 2016). Indeed, effort absence will result in not being serious in completing tasks based on the top priority of the sprint.

The last factor influencing the success of Scrums team members is the balance of member contribution. It is in line with the previous study (Lindsjørn et al., 2016). There are differences in priority levels in the balance of contribution when observing Satria's (2018) results, where this factor was in the fourth priority. It happened since Satria's study used priority techniques with AHP without relating it to the variables of team members' success. Domination of one team member can cause the contribution of ideas and input to be lost and impact the team's performance to solve problems (Seers, 1989).

Coordination, communication, and mutual support factors did not affect team members' success. It contrasts other studies (Hoegl & Gemuenden, 2001; Lindsjørn et al., 2016; Satria et al., 2018). In the research conducted by Satria (2018), it was the highest priority on mutual support, where this factor emphasizes mutually helping activities between team members in completing tasks. When it is related to job satisfaction and learning, which are components of team members' success, a qualitative analysis is needed to dig deeper in this regard.

5.3 Recommendation

The results of the factor analysis can be used as recommendations for Scrums users and the government to put forward the cohesion factor, effort, and balance of contribution. Recommendations for achieving success for Scrum team members include:

Balance of Contribution: improving team members' contribution ability requires technical roles and personal attitude competencies to support software development success (Asproni, 2004). Personal attitude competence here is the ability to work with a team (Asproni, 2004).

Cohesion: provides solidarity between teams to encourage continued loyalty to achieve sprint goals. It can be formed by aligning organizational goals and increasing its adaptability (Ramesh et al., 2012).

Effort: an activity provider or scrum master can help protect team members from off-team assignments (Lindsjørn et al., 2016). The importance of prioritizing every activity from product planning, development, testing, and delivery is each team member's effort (Lindstrom & Jeffries, 2004).

6 CONCLUSION

This study aimed to discover factors affecting team member success on the Scrums development project in Indonesia. The analysis results by SEM show that Scrums team members' success is affected by cohesion, effort, and balance of contribution. Furthermore, some factors do not affect team success, i.e., communication, coordination, and mutual support. The value of this research model is 73.2% or 0.732 (had a sufficient value), based on R-squared value which is between 0.5 - 0.75.

Recommendations for Scrums application are 1) improving team members' contribution, not only their technical roles but also personal attitude competencies of the members, 2) building team cohesiveness and cultivate a view of the vision and mission to achieve organizational goals, and 3) putting forward the notion that product planning, developing, testing and delivering activities are efforts of each member.

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