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People's Trust in a Virtual Project Team: Results of a Game Experiment

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Abstract: This study aims to: (1) find out the variables that influence people's trust in the virtual team in a project, (2) find out the relationship of these variables with people trust in the virtual team in a project, and (3) the relationship between the presence of experienced members on a virtual team in leading an organization to determine the success of a project. The experiment was conducted using online Werewolf game and collected questionnaires from 30 respondents that divided into 3 groups, i.e., (1) having experience of being leaders, (2) a combination of having and having no experience of being leaders, and (3) having no experience of being leaders. A correlation test and a comparative test were used to analyze the result. The results found four variables that could influence people's trust, i.e., (1) ability, (2) benevolence, (3) integrity, and (4) task faithfulness. All variables had a positive effect, except for task faithfulness. There is a relationship between the presence of leaders in a virtual team to the success of the project.

Keywords: Virtual team, trust, leadership experience, project success.

Introduction

Project Management Institute (PMI) defined a project as a temporary endeavor, which has a specific beginning and ending, to develop a unique product, service, or outcome [1]. Projects can be implemented at all levels of the organization; projects can be done by individuals or teams and can involve one or more organizations [1]. A traditional project usually has been carried out by a team working face-to-face such as in the infrastructure sector. This condition is considered beneficial because communication among all relevant parties in the project can be run smoothly. Moreover, in the face-to-face condition, problems can be resolved immediately because communication with decision makers is easier to do [2].

Nowadays, there are some projects that can be run by using a virtual team concept or can be called a virtual project team. One of the examples of projects that adopt virtual project teams is in the banking industry [3]. In the study, Kage [3] stated that the main reason for virtual team implementation in the banking industry is process re-organization that has an impact on cost reduction. Other than the banking industry, the information technology (IT) industry is an industry that rapidly adopts the concept. There are many companies and IT projects that have local virtual teams and global virtual teams. Global virtual team might have team members come from different countries, while a local virtual team, on the other hand, refers to individuals who work at the same institution or organization, including small and large institutions that have the resources to form a virtual team [4]. Since all team members communicate virtually, it happens frequently that they do not know each other personally.

Besides, studies about virtual teams in the construction sector and the factors that influence the successful adoption of this concept have been conducted by Rezgui [5]. Furthermore, a virtual team concept is usually adopted by the automotive industry. In this industry, the concept of virtual teams could enhance communication and collaboration between geographically distributed engineers at automotive manufacturers and supplier sites. This concept can help in getting better quality, reduced costs and time-to-market reduction for a new product vehicle [6].

Jones *et al.* [7] defined a virtual project team as a group of people who work together which are not co-located in order to achieve the project goal. In a virtual project team, team members do not need to meet face to face in order to run and complete a project. Each member only needs technology and communication media or device. The advantage of having a virtual project team is that they are able to gather talented people or experts easily even when the members are not co-located to complete projects faster and cost-effectively [1]. Jones and Graham [8] stated that the advantages of a virtual project team can be seen from the Hewlett-Packard company. The company was able to save $ 800,000 when trying to make an agreement in Argentina through a virtual team.

The change in the way of communication has an impact on team dynamics, one of them is the issue of people's trust. Chen and Chen [9] stated the development of trust is one of the main challenges in a virtual team because the tasks in a project are interdependent. Guzzo and Shea [10] stated that task interdependence is the degree to which team members rely on one another and must interact in order for the group to accomplish its work. It is supported by a claim by Staples and Webster [11] that task interdependence is a factor that can change the influence of trust in a team. Staples and Webster [11] also explained that in high task interdependence the team members are performing tasks where they rely on each other, and may have discussed roles, expectations and deliverables, so there are additional mechanisms driving expectations of fulfilling obligations. Thus, it can be known that trust among the team members plays a critical role in team performance.

Trust is a behavior that voluntarily accepts the uncertainty of other people's behavior in the hope that this behavior could produce positive results [12]. Furthermore, trust is well known as one of the main factors that determine the success rate of a project [13]. However, building trust among team members is not easy because team members cannot directly see the physical behavior of other members [14], and team members come from different locations or organizations [13].

The distrust of team members towards other members can put the project on hold. Team members tend to spend time monitoring other members and doing tasks that other members should do so that task duplication can occur [15]. This condition might result in making the project run longer than the expected schedule or the allotted time. Besides, the composition of the virtual team varies. According to Gibbs *et al.* [16], a virtual project team can have a formal leader, but the teams can also be run without the presence of a leader. Studies using student team projects have been conducted to learn about the non-presence of a leader in a team. For instance, Robert [17] studied virtual teams of graduate students from online global campus and assigned the students to some teams that do not have a formal leader. Besides, Kayworth and Leidner [18] also stated a study of an absence of a leader usually found in a student class project. In the condition where there is an absence of a leader in a virtual team, team members tend to indirectly manage the team so that they can still carry out their duties. This process of self-management by the team keeps the team functioning and achieving its goals [19].

According to Dainty *et al.* [20], team leadership is one of the most significant indicators for the performance of the project. Therefore, research is needed in order to determine the level of trust in a virtual team in a project and also project success based on the presence of a leader in a virtual team. Thus, the insights about people trust in a virtual team based on the presence of a leader could be obtained from this research. In this study, the experiment method used is a virtual game in order to measure the trust level among members of a virtual team by considering the presence of a leader in determining the success of the project. Even though a proper project monitoring is important in the project success [21], but this study only consider the completion and accomplishment of the project. When the project is finished, and its objectives are met, success in this study is considered to have been accomplished. Research on trust and using games for the experiment has been done previously by Takahashi *et al.* [22]. Therefore, this study attempts to address the three following questions:

RQ1. What are the variables affecting trust among virtual team members in a project?
RQ2. How is the relationship among those variables with trust in a virtual team in a project?
RQ3. How is the relationship between having an experienced member in leading an organization on a virtual team with the success of a project?

Besides, the remaining of this paper organized into four sections. In the first section, the literature review is presented to discuss factors affecting people's trust in a virtual team of a project. The second section explains the method used in the study. In the third section, the result from the experiment with the analyses and discussion is presented. The fourth section discusses the conclusion and suggestions for future research.

Literature Review

Trust can be defined in two different dimensions, which are cognitive trust and affective trust Cruz *et al.* [23]. Cognitive trust is defined as beliefs about other people's competence and reliability. According to Al-Ani *et al.* [24], this cognitive trust can make people more likely to take any risk. Besides, affective trust is defined as the emotional beliefs which can lead people to act in a way that they feel is right. According to Calefato *et al.* [25], the factors including integrity, benevolence, ability, and predictability involved in both cognitive and affective aspects can lead to the decision of an individual to trust.

Furthermore, there is some research [14], [26], [27] discuss about virtual teams to analyze about trust, effectiveness, and team collaboration in a project. However, research that studied about the factors that influence people's trust in virtual teams' projects is still limited. Choi and Cho [26] have conducted research about factors that influence trust in virtual teams and the results showed that trust can increase team collaboration in a virtual team.

There are some factors that could significantly increase trust in a virtual team which are (1) ability, (2) integrity, and (3) benevolence [27]–[29] Ability refers to a condition where the team members can believe and rely on the other team members based on their ability to carry out the tasks [27]. According to Clark *et al.* [30], a person who is highly qualified and has expertise in a certain field would be trusted for doing the tasks of in their expertise field. Although a person in one area may be highly qualified, that person may lack experience and training in another area they are not expertise in [30].

Integrity refers to the tendency of people to obey moral principles including justice, fairness, consistency, and promise fulfilment [27]. Mayer *et al.* [28] stated that a person having integrity is influenced by the consistency of individual's past actions, credible communication about that individual from another parties, the belief that the individual has a strong sense of justice, and the extent to which that party's actions match with his or her words.

Benevolence is defined as a willingness of people to behave in the team's best interest which requires a judgment on loyalty, commitment, and supportiveness [27]. Clark *et al.* [30] stated that benevolence is related with the motivation of individuals to the success of their relationship with other parties.

Moreover, Pinjani and Palvia [26] stated that trust and collaborative technology are included as factors that affect trust in a virtual team. Collaborative technology is defined as technology that plays a critical role in team collaboration and the achievement of team goals [26].

In addition, Glikson and Erez [31] mentioned that a psychologically safe communication climate is also another factor that affects the people's trust in a team. Psychologically safe communication climate refers to the freedom to express opinions without feeling humiliated, rejected, or underestimated [32].

Besides, Haines [33] stated that trust, goal commitment, and task faithfulness are parts of factors that affect people's trust in a team. Haines [33] defined goal commitment as a sense of belonging to the team to enhance the team members' commitment in order to achieve the team goals. Meanwhile, task faithfulness is a team member's perception to conduct the task correctly and properly [34]. Implicitly, it can be known that all of these factors including trust in a virtual team can affect team performance.

Team performance defines as the ability of the team to achieve its goals [35]. Besides, according to Hoch and Dulebohn [19], one important factor that affects the performance of virtual teams is team leadership. There are two types of leadership in virtual teams which are emergent leadership and shared leadership [19], [36]. Emergent leadership is described at the individual level that defines as people who are able to influence the team even though there is no formal leader in the team [37]. Meanwhile, at the group level, the team's ability to manage the continuity of the team without a leader [19] where the leadership is carried out by the whole team not a designated individual [38] is called shared leadership. In this type of leadership, all team members work together and influence each other so that the team goals are achieved [19]. Moreover, virtual leadership also has been discussed by Ibrahim [39] who stated that virtual leadership contributed significantly to performance in carrying out tasks in order to achieve the project's goals.

Thus, this study was conducted by developing research from Choi and Cho [27], where this study aims to determine the factors that influence people's trust and the relationship of those factors to people's trust in virtual teams. In addition, this study was conducted to determine the relationship between the presence of a leader in a virtual team with the success of projects which is similar and developing research by Hoch and Dulebohn [19], Scott-Young [36], and Ibrahim [39].

In this study, an experimental study was conducted in order to ensure all of the respondents would do the same project and get the same treatment. Thus, the results obtained from the respondent are not from different conditions and experiences, which will lead to the experimental results from all respondents can be compared. The experiment was conducted by asking the respondents to play game virtually in the group they were assigned to. The experiment used was based on the development of research by Takahashi *et al.* [22]. Other than conducting experiments, this study also used questionnaires to record the result of respondents' experiment. The experiment is conducted for considering the answers of the questionnaires filled by the respondents were based on the same conditions. In other studies, the respondents' conditions might be different which resulting in answering the questionnaires with different experiences and conditions. The difference of experiences and conditions for the experiment of respondents might lead to differences in the ability and perspective of respondents in filling out the questionnaire.

In the previous research, Bhat *et al.* [13], Alsharo *et al.* [14], Choi and Cho [27], and Zhang *et al.* [40] used questionnaires for measuring the variables exist in the research instrument. In that research, the questionnaires were distributed to individuals who have joined or have prior experience in virtual teams such as information technology. Thus, this research used a similar method with research by Cheng *et al.* [41], who used an experimental study by including a questionnaire for measuring the trust among virtual team members. On the other hand, there is still a limited number of researches which used experiment in order to determine the relationship between the presence of a leader in determining the success of the project.

Methods

Sample Selection

In this study, a nonprobability sampling technique was used for the sampling method [42]. The type of sampling technique used was purposive sampling. In this technique, the sample was selected based on their characteristics in accordance with the research objectives [43]. According to Dell *et al.* [44], there are some factors that could be estimated in determining the sample size, including the effect size and statistical power. The statistical power of an experiment is the probability that the effect will be detected and usually set to minimum 80% chance of finding statistical significance [45]. The result indicated that at least 25 samples are required for this study with the statistical power of 95.6%, which is higher than 80%. Thus, this study used 30 samples for the experiment, and has been considered to be sufficient. Each sample filled out a pre-test questionnaire and a post-test questionnaire for the experiment. Thus, in total, there were 60 data collected from the experiment. A different number of sample size might affect the result of the experiment, but further research is required to prove this claim.

This study consisted of 30 students. The students were from freshman, sophomore, junior, and senior year. However, the demographic data about the respondents were not collected and this study did not consider the differences in respondents' demographic data. The respondents were divided into three groups based on their leadership experience, which each group consisted of 10 students. The first group consists of students who have experience of being an organizational leader. The second group consists of a combination of students who have and have no experience of being an organizational leader. The proportion of the students who have and have no experience for being an organizational leader was equal, which were five students who have and five students who have no experience of being an organizational leader. This proportion is good to be used in comparing respondents who have and have no experience for being an organizational leader. The third group consists of students who have no experience of being an organizational leader. An organizational leader defines as a person who has been the chairman, vice chairman, and chief of department/division, at least once. This group aims to compare the trust among groups that have members who have and have no experience of being a leader. Moreover, the respondents were people who used an instant messaging application to communicate in their daily life.

Design of Experiment

The design of experiment used in this study was the development from experiments in literature studies. This design of experiment was used to explain the details for the experiment process that was carried out by respondents. Before the experiment began, all respondents were given a pre-test questionnaire that developed from research by Pinjani dan Palvia [26], Choi dan Cho [27], Glikson dan Erez [31], and Haines [33]. After that, the experiment was started by using the Werewolf game as an adaptation from the research that has been conducted by Takahashi *et al.* [22]. During the experiment, the respondents stayed anonymous and were unable to know the identities and roles of other players in their team.

Werewolf is a social deduction game that has several characters including werewolves, villagers, and seer. Werewolf game was chosen because it is a conversation-based multi-player game which is designed to evaluate trust [46], [47]. The goal for this game is that the villagers should find werewolves and save the village from werewolf attacks, or the werewolves are succeeded to take over the village. In this experiment, each game consists of ten students which were divided into two werewolves, seven villagers, and one seer. Werewolves main goal is to eliminate all villagers while the villagers have to protect the group from werewolves' attacks by killing the werewolves. Seer is also on the villagers' side but has the advantage of knowing the roles of other players. The other players do not know the roles of other players, except for the seer and fellow werewolves.

The game was divided into two cycles which were Day and Night cycle. At Night, all players should close their eyes, and actions were taken to eliminate villagers by werewolves and know the other player's identity by a seer. During the Day, all players should discuss and try to find the werewolves. The villagers win when all werewolves were killed, and werewolves win when the number of werewolves and villagers left were equal.

In the first round, at the Night cycle the werewolves had a chance to choose someone to kill and seer had a chance to choose someone to know their identity. At the Day cycle, all players had a chance to discuss who the werewolves for eight minutes and had not made an agreement on who would be killed or accused. On the next rounds, at Night cycle the werewolves and seer played their roles. Besides, at the Day cycle, all players had a chance to discuss who the werewolves for eight minutes and made an agreement on who would be killed or accused.

After the game ended, each respondent was asked to fill out a post-test questionnaire. The post-test questionnaire has similar statement items with pre-test questionnaire that adopted from research by Pinjani dan Palvia [26], Choi dan Cho [27], Glikson dan Erez [31], and Haines [33]. Additionally, the entire process of the experiment was recorded using a screen recording application. Success measurement in this study is when the project is completed, the project goals have been achieved. This means that the game has been resolved, even the werewolf can be guessed correctly.

Research Instrument Development

In order to get a suitable research instrument, a literature review about the research instrument was conducted on the previous research. Bhat *et al.* [13], Alsharo *et al.* [14], Choi and Cho [27], and Zhang *et al.* [40] have been conducted a study on virtual teams using a questionnaire as the research measurement instrument. Thus, in this study, the research instrument was developed based on that research. In this study, the instrument used was questionnaires with a Likert scale. There were five scales used in the questionnaires, including *Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4),* and *Strongly Agree (5).* Moreover, there are eight variables used for the questionnaires which are trust, psychologically safe communication climate, ability, benevolence, integrity, goal commitment, task faithfulness, and collaborative technology. Those eight variables are described into the thirty-one statements in the questionnaire which each variable has around three to eight statement items. The variables and statement items used in the instruments are adopted from research by Pinjani dan Palvia [26], Choi dan Cho [27], Glikson dan Erez [31], and Haines [33]. The variables and statement items from previous research are being developed according to the current experiments carried out. The adaptation of variables and the thirty-one statements items from previous research are summarized in Table 1.

Table 1. Questionnaire adaptation

Questionnaire Number	Variable	Source
Q1 - Q8	Trust	Palvia [26], Choi dan Cho [27], Haines [33]
Q9 - Q12	Psychologically safe communication climate	Glikson dan Erez [31]
Q13 - Q15	Ability	Choi dan Cho [27]
Q16 - Q18	Benevolence	Choi dan Cho [27]
Q19 - Q21	Integrity	Choi dan Cho [27]
Q22 - Q24	Goal commitment	Haines [33]
Q24 - Q27	Task faithfulness	Haines [33]
Q27 - Q31	Collaborative technology	Pinjani dan Palvia [26]

Data Collection Method

The process of choosing the respondents was started by asking the respondents to fill out an online form and ensure that all respondents were familiar and used a certain instant messaging application to communicate in their daily life. Moreover, the respondents also must be familiar and have been played the Werewolf game.

Each respondent was invited to attend a session of the experiment in a group chat of the instant messaging application with all the respondents from the same group they were allocated to. Before beginning the experiment, the respondents were given a link for the pre-test questionnaire that must be filled in. After that, the respondents started to play the game until the game goal was achieved. When the game was over, all respondents were given a link to a post-test questionnaire.

There were three sessions of the experiment that were held at different times for each experiment's groups. However, the three groups got the same treatment. The data was obtained from questionnaires given to respondents before (pre-test) and after (post-test) the games. The data collected were about:
1. Variables that affect trust;
2. Differentiation of trust before and after the experiment was conducted;
3. Conclusion whether the respondents achieved the game goal or not.

Pilot Test

The pilot test was conducted in order to determine whether the experiment was effectively following the research objectives [42]. The criteria of an effective experiment are the respondents are not confused with the rules of the game, the respondents are not confused with the flow of the game, the respondents do not find an ambiguous sentence from the questionnaire, and the respondents find no difficulty when filling out the questionnaires.

The pilot test was done by conducting experiments on a group of 10 respondents without considering leadership experience. Respondents of the pilot test were asked to evaluate the experiments; thus, the respondents of the experiment would not find any difficulties in doing the series of experiments. Moreover, the data collection process could be done properly.

The results of the pilot test showed that there are some improvements that need to be conducted to the experiment material. Improvements that must be made including the technical rules and procedures that must be followed by respondents during the experiment. Therefore, the improvements were conducted by referring to each evaluation point by improving, clarifying, and completing the experimental rules obtained from pilot test results [42].

Validity and Reliability Test

Validity and reliability tests were carried out to see if the research instrument used was adequate. In order to ensure the validity of the research findings, the incorrect items of variables might be eliminated. Before conducting validity and reliability test, normality test was done to know the suitable approach for validity and reliability test to be used. The Shapiro-Wilk test was used for the normality test with a 0.05 significance level. This test was selected because it has a good power [48]. The normality test showed that the significance value for all of the items was less than 0.05. It implied that all of the items were not normally distributed, hence non-parametric will be used for the statistic test.
The non-parametric test used for validity is the Spearman test. Validity is an important criterion and needed to evaluate the quality and to determine whether the instrument can be used for the research [49]. The instrument categorized as valid if the r-calculated value is greater than the r-table value and greater than the significance level. Based on the validity test result, all items in this research are valid with the r-calculated value greater than the r-table value (0.259). None of the items were eliminated and all of the items could be used for the reliability test.

Reliability test used to measure to what extent we can trust the results by measuring the same thing in the same group at different times and conditions [50]. Cronbach's Alpha was used for reliability testing in this study. The variables categorized as reliable if the Cronbach's Alpha value is greater than 0.6 [51]. Based on the

reliability test result, the Psychologically safe communication climate is unreliable. Thus, in the next test statistic, this variable was not considered to be analyzed.

Result and Discussion

Correlation of Trust with Independent Variables

A correlation test was conducted using Somer's d test. This test was used because the type of data for two variables, dependent variable and independent variable, to be tested were ordinal data. The dependent variable in this study is trust, while the independent variables are the variables obtained from the reliability test results [42]. The result of the correlation test shows that the variables that could affect people's trust in a virtual project team are ability, benevolence, integrity, and task faithfulness. The results of the correlation analysis on the variables are shown in Table 2.

From the test can be known that ability significantly affects people's trust. This result is supported by research from Choi and Cho [27]. If the team members presume that the ability of the other team member is high, then the trust toward the other members will be higher. This condition shows that team members assume that other members have the ability to carry out tasks based on their roles. In addition, team members could judge that their colleagues, which are the other team members, are those who deserve to work on the project. These assumptions and judgments make the trust level among team members will be higher.

The test result showed that benevolence is known to positively influence people's trust even though the strength of the relationship is low. This result is different from the findings of Choi and Cho [27] which explained that benevolence does not have a significant effect on people's trust. However, in this study, benevolence is proved to exist in the group of experiment. This condition shows that the team members give the best effort for the team. Moreover, can be known that the team members paid more attention to other team members and did not do things that harm other team members. Based on the results of the correlation test, this behavior can be known to support the trust level in the team. If the attention and absence of actions that could harm other team members is higher, the trust level among team members will also be higher.

Integrity also has a significant effect on people's trust. Integrity is described as a honest behavior, a strong principle and a sense of justice [27]. The results of this study are supported by the findings from Choi and Cho [27]. The higher the integrity of the team members, the trust level in the team will also be higher. This means that all team members must have integrity to make the team run well and have a good performance in order to achieve the team goals. Besides, each task was done according to the role of each team member. This behavior could lead to the increasing in the trust level among team members.

Different from the other variables, task faithfulness has a negative effect on trust. Task faithfulness is the perception that tasks are completed in the right way [33]. The results of this study indicated that team members could trust other members even though the task is completed in a way that the team members think is inappropriate. If the value of task faithfulness in the team is low, then the trust level in the team will be higher. This different result of the findings is shown in the research of Haines [33]. In the research, Haines [33] stated that task faithfulness is important in the early stages of developing trust and when the team members work together. These differences could be obtained because the design of experiment used in this study and in the previous study was different. The experiment from Haines [33] aimed to complete tasks with the least number of emails and the respondents had to discuss in order to achieve an agreement on the most appropriate way to achieve the team goal. Whereas in this research, respondents did not need to do this. In the experiment, the number of messages sent by respondents was not limited. The respondents are freely given the opportunity to do and try various ways to achieve game goals.

Tabel 2. Correlation test result of trust with independent variables

Independent Variable	d-value	p-value	Result (Correlation)
Ability	0,494	< 0,001	Significant (positive)
Benevolence	0,367	0,001	Significant (positive)
Integrity	0,583	< 0,001	Significant (positive)
Goal commitment	0,004	0,978	Not significant
Task faithfulness	-0,499	< 0,001	Significant (negative)
Collaborative technology	0,238	0,084	Not significant

However, goal commitment has no significant effect on people's trust. This might be because even though the main goal of the team is to complete the project, not all team members in the experiment have the same mission in achieving that goal. In other words, each team member has different responsibilities and can even feel unsafe when achieving the goal of the project. It supported by Haines [33] that claimed goal commitment is influenced by the feeling develops when team members have bargained over the procedures the group will employ to achieve its objectives. The team members must first ensure that the team is safe for them, and they will be ready to dedicate themselves to team goals once they feel safe [33]. On the other hand, it is crucial that all members share the same vision or goal, because team members who are not committed to the team's goals have less need to rely on other team members who would be the ones to help realize the goal [33], They are hence less inclined to show trust in the other team members.

Other than goal commitment, collaborative technology also has no significant effect on people's trust. This might happen due to the low frequency of interaction between team members in the use of this technology in the design of experiments. The use of collaborative technology in this experiment was the first and only time used by the team members. Pinjani and Palvia [26] claimed that the team's feelings and attitudes are progressively changed through more technological interaction, which fosters a greater sense of trust. This is also supported by findings from Kipkosgei [52] that collaborative technology strengthened the people trust and will become stronger when the use of collaborative technology is high than when the use of collaborative technology is low.

Respondents' Trust Before and After Conducting Experiment

The Wilcoxon test was conducted in order to compare the trust level of respondents before and after the respondents completed the project or experiment. The data used in this study was obtained from two data sets. One set that consist of thirty data were obtained from three groups of respondents by filling out pre-test questionnaire, while the other data set also consist of thirty data obtained from three groups of respondents by filling out the post-test questionnaire. The result of Wilcoxon test showed that the significant value of comparing trust level before and after conducting experiment is 0.007. This condition explained that there is a difference in the trust level of respondents before and after carrying out the project [42].

Based on the measurement of the differences between the two data sets, a negative rating was obtained for eighteen out of thirty data. This difference happened because of the decrease that occurs in the trust level of the respondents working on a project with the team members. This condition might be affected by the lack of information about the role of team members, so that the project was carried out by guessing the person who caused chaos or problem occurred on the team. The problem might be caused by the difficulty in interpreting team members' performance during working on the project because in a virtual project team there is less visible information about the team members [53].

The findings from Mayer *et al.* [28] and Aubert and Kelsey [54], that trust of team members in others is impacted by their ability to observe directly what others are doing, support this result. Moreover, Rusman *et al.* [53] also stated that to improve the interpersonal trust in a virtual team, the assessment of trustworthiness is needed by making information available about individual in virtual project team members. Besides, trust among team members also affects an individual's cognitive assessment of the other person's behavior [55] and individual tend to put high trust in information based on people's experience [56], in this case it might be the leadership experience. This condition is fitted with previous research because in this study, the team members did not even know the role of the other team members and they have to observe the behavior of all team members. Thus, presenting personal information about team members positively affects the team's trust level, as it allows members to measure the trustworthiness of the other team member [53].

During the game, the trust level of team members toward other team members decreased until the end of the game. This result is supported by the findings of Jarvenpaa *et al.* [29], where at the early stage of teamwork, trust levels among team members were strong, and decrease over time due to the perceived ability of other members. Jarvenpaa *et al.* [29] also stated that trust-building exercises are needed because it has a significant effect on the perceptions of team member towards the ability, integrity, and benevolence of the other team members.

In order to overcome this problem, the strategy needed by the organization must be decided. According to Ford *et al.* [57], there are three interrelated categories, including organization, leader, and team that can contribute to the success of a virtual team. Moreover, the cues in each category can help in the development of trust levels

at two levels which are initial team creation and continuing team performance [29], [58]. This condition might have happened because trust may be established based on initial team member interactions and reinforced with the ongoing interpersonal relationship experiences [55]. Trust might be affected by the personality types, stereotyping, and initial interactions of the team members [30].

The other solution is by conducting an evaluation of trust among team members. According to Chen and Chen [9], the trust evaluation must be conducted during three different phases in a project which are early phases, middle phases, and late phases. The three phases used to estimate trust level among team members could be done by applied evaluation from the proposing project phase until the initial progressing and controlling project phase (early phases or Phase I), from the start of the progressing and controlling project phase begun a span to a specific project milestone (middle phase or Phase II), and from the end of the above milestone to the closing phase (late phase or Phase III).

Relationship between Leadership Experience with the Achievement of Project Goals

In this study, the project was carried out by three groups of respondents which has been defined based on the respondents' leadership experience. From those three groups, only one group could be managed and achieve the goal of the project. The group that can achieve the goals is a group that consists of people who have experience as being a leader in an organization. Based on these results, can be known that the first group has a good self-managed team [42]. The self-managed team is defined as a team that effectively manages their own performance, makes a decision that related with their work, and take collective responsibility for achieving their team's goal [59], [60]. The implementation of self-managed team can improve the decision-making quality [61]. This condition supports the result that the first group could manage the team effectively and achieve the goal of their team.

Even though all of the groups had informally appointed leaders, the first group was able to make the team achieve its goals. This could have happened because the professional identities or experiences of team members will strongly structure how they perform their work [57]. In other words, this condition might have happened because all team members have experience as being a leader in an organization. This experience could make each team member able to lead the team. Besides, according to Potter and Balthazard [62] and Balthazard *et al.* [63], the other variable related to a self-managed team that can influence the team performance is the team member's communication.

This collaboration indirectly affects the team to achieve the goal of the project. The results of this study are supported by the research from Hoch and Dulebohn [19] which showed that the important factors affecting the performance of virtual teams are implementing emergent leadership and shared leadership. Emergent leadership and shared leadership are positively related to virtual team performance.

Emergent leadership is described at the individual level where the emergent leader is someone who is able to influence the team even though there is no formal leader on the team. Emergent leadership occurs in a condition when team members voluntarily take the role of a leader in a team. An individual gives influence to the team as a leader without being mandated as a leader [37]. According to Pavitt *et al.* [64], in emergent leadership, the activity rate can show a high dedication and interest in other team members, which are required for the problem-solving capabilities of the team.
Meanwhile, at the team level, the ability of the team to manage the continuity of the team without a leader is called shared leadership. In this type of leadership, all team members work together and influence each other so that the team goals are achieved [19]. Other research conducted by Scott-Young [36] also provided additional evidence that shared leadership affects the final outcome and project success. According to Scott-Young [36], shared leadership is a mediator of the input in the form of a team towards the output in the form of project success. One of the indicators of a successful project is when the project can achieve its goals.

However, the second group, a group that consists of a combination of people who have and have no experience as being a leader, almost reached the project goal. However, this group failed at the last stage of the project. In addition, the third group, which consists of people who have no experience as a leader in an organization, failed to reach the goal during the process of a project. According to Jarvenpaa *et al.* [29], the failure of these two groups might be happening because of the lack of leadership.

Conclusion

The concept of virtual teams is increasingly being used along with the development of technology. The implementation of this virtual team concept is also carried out on the project. However, the use of the virtual teams' concept can affect the level of trust among team members. To answer the first research question of this study, the results showed that there are some variables that affect people's trust in a virtual team. The variables are ability, benevolence, integrity, dan task faithfulness. The difference in the level of people's trust occurred after the team carried out the project. The difference that happened was the decreasing of trust level among team members. This study revealed that ability, benevolence, and integrity variables had a significant effect and has a positive correlation with people's trust. Nevertheless, task faithfulness had a significant effect and has a negative correlation with people's trust. This has answered the second research question. Besides, for the third research question of this study, we found that there was a relationship between team members who have experienced in leading organizations in virtual teams with the success of the project. However, there are several scopes of problem and limitations used in this study. Firstly, the trust level that will be examined is only the trust level for a virtual team. Secondly, 5-likert scale is used in the experiment, thus there might be biased when people choose "neutral" option. Next, the respondents had never been joined as a respondent to a similar study. Lastly, the experiment in this study used Werewolf game where the players remain anonymous and cannot know the identities and roles of other players. Possible further research can consider and compare the trust level for virtual teams with offline teams, since the trust issue might appear in both teams. The use of even-number-Likert scale for assessing the instrument in the questionnaire also can be used to minimize the biased effect of people answering "neutral".

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Appendix

Appendix 1. Measurement items

Trust

Q1. Trust among team members to carry out their respective duties.
Q2. Can rely on team members to achieve goals.
Q3. Have full confidence in team members that they are capable of carrying out tasks.
Q4. Can depend on team members to do a good job.
Q5. The team members trust each other.
Q6. Team members rely on each other.
Q7. Team members pay attention to each other's feelings.
Q8. Team members are friendly to other members.

Psychologically safe communication climate

Q9. Team members can express their opinions freely.
Q10. Team members discuss the problems that occur.
Q11. Team members use words by considering the feelings of other members.
Q12. Team members are free to be assertive about what they think and feel.

Ability

Q13. Team members have the required skills and abilities.
Q14. Team members have the required knowledge and skills.
Q15. Team members are eligible to perform tasks.

Benevolence

Q16. Team members pay attention to the personal interests of other members.
Q17. Team members are concerned about the welfare of other members.
Q18. Team members will not do things that will hurt other members.

Integrity

Q19. Team members are honest.
Q20. Team members have strong principles in their behavior.
Q21. Team members have a strong sense of fairness.

Goal commitment

Q22. Team members find it difficult to take the goal of a task seriously.
Q23. Team members believe that it is unrealistic for the team to achieve goals.
Q24. Team members do not care if the team achieves goals or not.

Task faithfulness

Q25. The team may have completed a task incorrectly.
Q26. The team failed to complete the task as it should.
Q27. The team did not complete the task in the most appropriate way.

Collaborative technology

Q28. Team members are equipped with adequate tools and technology to perform their duties.
Q29. Technology allows team members to work on different subtasks simultaneously.
Q30. Technology allows the development of social relationships among team members.
Q31. Technology enables knowledge sharing among team members.