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Exploring the Effects of Shared Leadership on Project Virtual Team Performance

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Abstract: A project virtual team in general refers to a group of geographically dispersed members who rely on communications technology to accomplish project tasks. This team structure has been increasingly utilized in project environments, especially post COVID, given its potential to accommodate flexible work arrangement, reduce project costs; and leverage knowledge and expertise from people around the world to enhance project performance. Drawing from the shared leadership literature and sixteen semi-structured interviews with practitioners involved in project virtual teams in Indonesia, we investigated how shared leadership is exercised in project virtual teams; and how it affects project performance. The results showed that shared leadership can be exercised through collaborative decision-making, collaborative task allocation/monitoring, and empowerment. In project virtual teams, shared leadership practices can trigger positive affective reactions from team members, leading to improved project delivery efficiency and better knowledge transfer. This study extends prior shared leadership literature, which predominately focuses on teams in permanent organizations, to a temporary project environment. It offers theoretical insights into the mechanism through which shared leadership affects project virtual team performance. Our findings also offer important implications for shared leadership practices in future project virtual teams.

Key words: shared leadership, virtual team, project management, team performance, project performance

1. INTRODUCTION

A project virtual team in general refers to a group of geographically dispersed members who rely on communications technology to accomplish project tasks (Bell & Kozlowski, 2002 [1]). This team structure has been increasingly utilized in project environments, especially post COVID, given its potential to accommodate flexible work arrangement, reduce project costs (e.g., reduced travel/office costs), and leverage knowledge and expertise from people around the world to enhance project quality (Iorio & Taylor, 2015 [2]; Verburg et al., 2013 [3]; Hertel et al., 2005 [4]). Despite of these benefits, virtual project teams are also known to have several managerial challenges. In particular, due to the lack of physical connectedness among team members (i.e., not being co-located in the same location), it can be more difficult for team members to communicate complex project tasks, establish trust, build team cohesion and exchange knowledge (Verburg et al., 2013 [3]; Reed & Knight, 2010 [5]). These challenges, if not being properly managed, can lead to misunderstandings and conflicts among team members, which in turns negatively affect the project performance.

Prior literature (e.g., Iorio & Taylor, 2015 [2]; Nauman et al. 2010 [6]) has highlighted the importance of effective leadership in project virtual team management. Shared leadership can be viewed as a dynamic and interactive influence process among individuals in groups, aimging to lead one another to achive group and/or organizational goals. In other words, it refers to a collective set of behaviours and

roles of all members in the team, rather than the leadership being exercised by a single individual. The leadership can also be shared among team members at different points in time (Scott-Young et al., 2019 [7]). This leadership is particularly beneficial in complex and dynamic environments where the tasks are subject to high degree of time pressure and risk and require collaborative problem solving effort (Pearce & Sims, 2002 [8]), such as project virtual team environments.

Shared leadership has attracted increasing research efforts in the past twenty years. Most of the prior studies however have focused on the permanent organization context (Scott-Young et al., 2019 [7]); and thus their findings may not be directly applicable to project environments due to the unique characteristics of projects (Ding et al., 2017 [9]). First, each project is unique and temporary (i.e., has a specific timeframe). This means that the project leader and team members may work together for the first time; and the leader-member relationship will be limited to a certain time period. This characteristic, together with the pressure to complete the project on time, could impose significant challenges in the project team building and management. Second, project team members are likely to be assigned to a project on a part-time basis. This means that they will need to continue to assume their functional roles. As such, the project manager may not have the full authority over project team members (i.e., the leadership is split between the project and functional mangers). These two characteristics suggest that leadership in project environments may require additional considerations beyond those considered in the permanent organization context (Ding et al., 2017 [9]). Following this line of thinking, although shared leadership is found to enhance team performance in permanent organizations, its effect and boundary conditions in project virtual team performance warrant further theoretical and empirical considerations. Accordingly, this research aims to explore the effects of shared leadership on project virtual team performance. Specifically, it investigates: (1) How shared leadership is exercised in a project virtual team; and (2) How shared leadership affects project virtual team performance? Findings from this research can add to the limited understanding of shared leadership in project management literature; and offer important practical implications.

2. THEORETICAL PERFORMANCE

2.1 Project Virtual Team Performance

A project virtual team is typically characterized by the team's geographic dispersion (i.e., team members are not co-located) and high reliance on technology to overcome the communication challenges (Bell & Kozlowski, 2002 [1]). Members in a project virtual team are likely to be located in different regions and/or countries; and thus rely on technology for information sharing, coordination, and decision-making for project tasks. Yet, the management of project virtual teams require additional consideration owing to the unique project environments. Specifically, project virtual teams are temporary and have specific life spans (Ding et al. 2017 [9]; Bell & Kozlowski, 2002 [1]). As with most projects, a commitment is made to complete project tasks within a set timeline, which makes managing collaboration, trust and cohesion among geographically dispersed team members even more critical in project virtual teams. Furthermore, the team members are likely to have other roles (e.g., functional roles) while they are involved in the project. This multiple-role arrangement increases the likelihood for role conflicts and ambiguity, which require managerial attention in project virtual teams.

Broadly speaking, researchers have taken two different perspectives, namely project-oriented and team-oriented perspective, to assess project virtual team performance. The project-oriented focus uses "project performance" as a proxy for project virtual team performance. Given the project virtual team's primary focus on project output delivery, project performance in these cases is often measured by all (or any) aspects of iron triangle (i.e., time, cost and scope/quality) (Creasy & Carnes, 2017 [10]; Lee-Kelley & Sankey, 2008 [11]; Zhang et al., 2018 [12]). On the other hand, the team-oriented focus takes "a team perspective" to measure project virtual team performance. Some of such examples include team satisfaction (Zhang et al., 2018 [12]), efficiency (Iorio & Taylor, 2014 [13]), knowledge sharing (Reed & Knight, 2010 [5]), and learning and innovation (Creasy & Carnes, 2017 [10]). Team satisfaction showed how the team members were satisfied with their team in terms of aspects such as work relationships, individual performance and individual work appreciation. Meanwhile, team efficiency was measured by the duration of conflict identification and resolution. Knowledge sharing captured how implicit and explicit knowledge is shared formally and informally in project virtual teams. Finally, team innovation and team learning reflect project virtual team's use of innovative means (e.g., concepts, processes and products) aimed at increasing team performance and the members' learning behaviours.

These prior literatures clearly showed that project virtual team performance can be assessed from different perspectives. In this study, we assessed project virtual team performance in terms of project delivery efficiency (i.e., how well a project meets its planned schedule, budget and scope) (Zhang et al., 2018 [12]); and the level of knowledge sharing in the project virtual team. We choose to focus on project delivery efficiency as this remains project teams' primary focuses, and it can be viewed as a proxy of project team performance. Additionally, given that the potential to leverage knowledge/expertise from people around the world to enhance project quality is recognized as one of the reasons for using virtual team structures; and yet the exchange of knowledge is considered as a significant challenge in such environments (Reed & Knight, 2010 [5]), we included the level of knowledge sharing in our assessment of project virtual team performance.

2.2 Shared Leadership and Project Virtual Team Performance

In principle, shared leadership views leadership as a collective set of behaviors and roles assumed by all members in the team, rather than having the leadership exercised by a single individual. In the project management context, shared leadership refers to the sharing of responsibility and influence among team members while still being governed by the vertical project manager. This "shared" leading responsibility aspect can potentially address the managerial challenges arising from the geographical dispersed nature of project virtual team. For example, project team members are likely to be based in different regions and countries with diverse cultural backgrounds, leading to different expectations about the project and their leaders. They may also have various levels of knowledge and skills in carrying out project tasks (Scott-Young et al., 2019 [7]). The project virtual team performance thus depends significantly on team members' shared view about the project, effective coordination and clear understanding about the project tasks and self-motivation. Shared leadership is argued to be effective in achieving these (e.g., Hoch & Kozlowski, 2014 [14]; Iorio & Taylor, 2015 [2]).

Shared leadership is conceptualized differently in prior literature. Following these prior studies (e.g., Bruccoleri et al., 2019 [18]; Pitelis & Wagner 2019 [9]; Scott-Young et al.,2019 [7]), this study investigates shared leadership practices by understanding how project leaders engage team members to collaboratively make decisions and allocate/monitor project tasks; and empowered team members. These three characteristics are summarized in Table 1.

Table 1 Example Behavioural Characteristics of Shared Leadership

Characteristics	Description
Collaborative decision-making	Project decisions are made collaboratively by the project leader and team members
Defined task allocation and monitoring	Project task allocation and definitions are allocated by the project leader or the organization. Project leader and team members share the responsibilities for continuous monitoring and controlling of project tasks
Empowerment	Empowering team members by providing them the autonomy to make task related decisions and necessary supports (e.g., resources, clear task descriptions and guidance) to carry out the tasks; and by motivating them to work collaboratively and communicate with others.

Studies focusing specifically on the effects of shared leadership on project virtual team performance is very limited. As such, we draw insights from the broader shared leadership literature in organizational contexts and project team mangag,ent literature. Overall, it was found that shared leadership can improve project task performance (Carson et al. 2007 [15]; Zhu et al., 2018 [16]), project innovation (Currie & Spyridonidis 2019 [17]), project team satisfaction (Bruccoleri et al. 2019 [5]) and knowledge sharing (Carson et al. 2007 [15]; Zhu et al., 2018 [16]). Although not focusing specifically on project virtual team, these insights about positive effects of shared leadership on various aspects of project team performance lay the solid foundation for our study.

3. RESEARCH METHODOLOGY

3.1 Samples and Procedure

This research aims to understand how shared leadership is exercised in a project virtual team; and how does shared leadership affect project virtual team performance. Given the lack of prior literature focusing specifically on the relationship between shared leadership and project virtual team performance, this research is considered as exploratory; hence, a qualitative research design involving semi-structured interviews is used. This research design is appropriate as it allows us gain in-depth and rich insights, that are lacking from a questionnaire, about the shared leadership in practices from multiple perspectives. Semi-structured interviews also provide the participants with the flexibility to reflect on their experience in answering our interview questions; and thus potentially give rise to unexpected events and findings.

This study uses projects as a unit of analysis. We first identified projects in Indonesia that: (1) have team members who are not co-located; and (2) had been executed for at least two months. The first criterion ensure that the participants are working in project virtual team; while the second ensures that the participants have the opportunities to work with others for a sustained time period. A research participation invitation was then sent to these projects' leaders, such as project managers and/or managers of a sub-group in a large project. Out of the 27 potential participants contacted, 16 participants (i.e., 10 males and 6 females with an average of 6.5 years' industry experience) from 14 projects completed the interviews. The participant profiles are provided in Table 2.

Table 2 Participant Profiles

Proj. ID	Brief Description	Budget (AUD)	Duration (Months)	Participant ID	Role
A	Design and build port	237 million	18	A01 A02	Leader Member
B	Design & build dock/sea dredging system	N/A	12	B01	Leader
C	Design and build 150 KV substation	8.7 million	12	C01	Leader
D	Design and manufacture medium voltage switchgear	84,000	2	D01	Leader
E	Maintenance of 500 KV substation	7.4 million	12	E01	Leader
F	Global standardisation of Enterprise Resource Planning (ERP) system	N/A	6	F01	Member
G	Design and build water purification system and highway	9,6 million	21	G01	Leader
H	Design and build bank premises	21,5 million	21	H01	Leader
I	Improve sales and business operation	4, 000	4	I01	Leader
J	Design &and build pilot plant for nickel extraction	2,96 million	18	J01	Member
K	Build and design medium voltage switchgear for data centre	250, 000	4	K01	Leader
L	Build and design medium voltage switchgear for oil and gas company	1,9 million	8	L01	Leader
M	Design and procurement of production facility for oil and gas company	500, 000	6	M01	Leader
N	Assess the feasibility of mobile application development for rural health conditions	1.48 million	24	N01 N02	Leader Member

3.2 Data Collection and Analysis

The data were collected through semi-structured interviews. The interview questions consist of three parts. The first part focuses on the selected projects' background (e.g., project scope, budget and duration) and participants' role/responsibilities in this project and their perceived team performance. The second, and the main, part of the interview focuses on understanding how shared leadership is practiced in the selected projects; and how shared leadership affects project virtual team performance. In the cases where both project team leaders and members were interviewed, the same set of questions were used; however, they were phrased accordingly to reflect different perspectives.

The data gathered from the interviews are analysed through an iterative process (Yin 1994 [20]. Specifically, we first listened to the interview recordings in its entirety to grasp each participant's general conception. We then analyzed the data systematically to identify emerging patterns across cases in corresponding to our research questions (e.g., the ways shared leadership are exercised and the relationship between the shared leadership and project virtual team performance) and cluster relevant

interview quotes. For example, the response "*If they have a solution, I will check it first. If it is good, I will let her or him execute their idea*" illustrates the circumstance where the project team members were given the guidance and (some degree) of autotomy in performing their tasks. This is thus categorized under the question related to how the project leader empowers the project team. In this process, we further contrasted our empirical findings with theoretical references to ensure the consistency between the data and the theory. A number of measures were also taken to ensure the validity and reliability of this study. For example, we have ensured validity through: (1) conducting several iterations by analyzing each project as a unique case to explain shared leadership practices and their effects; (2) clarifying the responses with the interviewees during the verbal interview process or requesting additional explanation after receiving email interview responses; (3) conducting cross-case analysis across multiple interview responses, and (4) linking the coding results with the existing literature. Meanwhile, during the interview process, especially for verbal interviews, reliability was ensured through following the defined interview protocol to ensure that consistent procedures were followed for all interviewees.

4. RESEARCH FINDINGS AND DISCUSSION

4.1 Shared Leadership Practices on Project Virtual Team

As previously discussed, shared leadership can be reflected in three different behavioural characteristics, namely (1) collaborative decision-making (i.e., how project decisions are made collaboratively by project leader and team members); (2) collaborative task allocation and monitoring (i.e., how project tasks are collaboratively allocated and monitored); and (3) empowerment (i.e., how the project leader motivates the team and gives the team members the autonomy and resources to carry out the tasks). Our findings largely support these characteristics and reveal another important aspect of shared leadership: team building (i.e., how the relationships within the team is strengthened).

Collaborative Decision-making. One of the predominant characteristics of shared leadership is collaborative decision-making (Carson et al., 2007 [15]; Hoch & Dulebohn, 2013 [21]), which means the decisions are generally reached with the involvement of team members. Given that projects often involve expertise from multidisciplinary teams, project leaders need to coordinate the sharing of expertise and encourage collaborative decision-making in order for the project team to function more efficiently (Scott-Young et al., 2019[7]). Collaborative decision-making contrasts with top-down decision-making. The decision is obtained from the team, rather than being directed by the project leader or people in higher positions (Hoch & Dulebohn, 2013 [21]). In shared leadership practice regarding decision-making, the team members have complementary and overlapping influence based on the particular situation (Pitelis & Wagner, 2019 [19]). This results in the distribution of influence among team members, rather than concentrating influence around a single project leader. This collaborative decision-making aspect of shared leadership is highlighted by almost all of our participants. For example, a project leader (A01) stated: "*If there was an engineering issue, as a leader, I involved the senior engineer. While for man-hour issues, I involved the drafter. Basically, I utilized the team's resources to solve the problem rather than relying on my own skills."* A project team member (N02) further explained why a collaborative decision-making is essential by stating "*In principle, the project needs us to work together. For example, the IT team made the apps. But they have to know the actual user needs, and this information comes from the science team. The science team usually get reports from health workers about problems with the apps. As we don't understand the IT stuff, we communicate with the IT team. Then we communicate the answers to the health workers. Hence, in decision-making, we make decisions together."*

Collaborative Task Allocation and Monitoring. Project tasks must be well defined and then allocated to team members in accordance with their roles in the project and prior experience. This view is shared by almost all of our participants, as illustrated in: "*The defined project tasks are allocated to team members based on their competencies"* (I01, Project Leader). Additionally, due to the geographically disperse nature of virtual teams, it is critical to continuously minitor and control project tasks through frequent proactive and reactive communication with the support of technology. This is noted by the Leader of Project N, "*We have two tools, every week we update in online platform, including the due date. I check individual progress through the online system. Three days prior to the deadline, I will follow up if there is no update. I will follow up through email and verbal communication. We also have a Slack. We can tag the related person if the deadline is approaching"* (N01, Project Leader). Similarly, some participants highlighted the risk of not having this regular monitoring and

controlling, such as "*We don't have regular meetings for the internal team. After the task is delegated, sometimes each person only knows his/her job. Therefore, he/she doesn't know the project in terms of a 'zoomed out' vision. If a person encounters a difficulty, he or she cannot find the appropriate answer. Therefore, regular meetings would be useful."* (J01, Project Member)

Empowerment. The importance of empowering team members in a project virtual team is highlighted by almost all of our participants. In such an environment, empowerment is achieved through increasing team motivation and autonomy, and providing the necessary resources and team accountability (Nauman et al., 2010 [6]; Pearce & Sims 2000 [22]).

Prior literature has suggested two common approaches to motivate teams for task accomplishment, namely transactional (i.e., focuses on a system of reward and punishment) and transformational (i.e., emphasises personal relationships between the project team members) (Pearce & Sims, 2002 [8]). Both of these approaches were observed in our data, as reflected in the following comments made by the Leader of Project C: *"It is tricky to motivate the team, and it depends on the conditions. There are two to three projects that started in February and March. The Kick-off Meeting was conducted at the beginning of the year. May to June is a long holiday due to Eid day. I said: Please have a look. If you're running late, during the holiday, you will be interrupting the team progress. This comment urged them to finish their tasks on time. At the end, it proved that the job indeed could be finished before the holiday…..If the time to completion is good, I will not hesitate to promote them. Also, the team is aware of the impact if they do not meet their targets"* (C01, Project Leader).

In line with Nauman et al. (2010) [6], our participants also support the need to provide project team members with the autonomy to perform their tasks, yet within boundaries. For example, a project leader noted that "*We have a clear function and job. I do not control what they do. As long as the output aligns with the project goals"* (K01, Project Leader). The boundaries are set in several ways, such as by developing clear roles and responsibilities, developing standardized project documents, and establishing open communication channels. Clear boundaries are particularly critical in the project virtual team environment given the limited opportunities for immediate formal/informal face-to-face interactions.

Empowerment also means to provide guidance and resources to enable project team members' participation in the decision-making process and/or in undertaking their allocated tasks (Nauman et al., 2010 [6]). In this regard, our participants pointed out the importance of information sharing in project virtual teams. In particular, team members need to be provided with easy access to project information; and the opportunities to give feedback on the circulated project documents. In a co-located project team, information required for the project tasks can be exchanged more easily among project team members through formal and informal channels. This is not the case in project virtual team given its geographically disperse nature; and as such require extra managerial attention. This is noted in the statement such as "*This is not a standard project because there are a lot of special requirements. Some parts are feasible. I arranged for them* [team members] *to discuss with senior engineers or engineers of other products or engineers who have ever worked with a similar project.*" (K01, Project Leader).

Team Building Activities. Our findings suggested that some degree of team building activities, preferably face-to-face ones, is critical to project virtual team performance. Team building refers to formal and non-formal team interventions which aim to improve the social relations, role clarity, problem-solving and interpersonal issues which could affect the team's functioning. Such activities can build interpersonal relationships and thereby foster trust among project team members. This view is illustrated in: *"We have non-work activities to build relationships. This can build trust so that we can do the work autonomously. No need to tell A, B, C and D who the project leader is. So far, I just naturally become part of my team"* (N01, Project Leader). Giving attention to team members' activities outside work is also considered as an effective way to build interpersonal relationships. This view was highlighted in: "*Having a non-formal activity such as talking about something from outside work, asking about movies or hobbies, makes the team feel relaxed and calm. This creates stronger bonding and breaks the work tensions."* (A01, Project Leader).

4.2 Shared Leadership Effects on Project Virtual Team Performance

Our findings showed that shared leadership can trigger a positive affective reaction (e.g., positive emotions, such as confidence and self-worth, and mood) among team members. This reaction is argued to contribute to the increased project delivery efficiency, and improved explicit and implicit knowledge sharing (Hoch & Dulebohn, 2013 [21]; Zhu et al., 2018 [16]) in project virtual teams.

Team Members' Positive Affective Reaction. Most of our participants hold the view that shared leadership practices lead to positive affective reactions in a project virtual team, such as feeling believed,

appreciated, independent, important and proud. These positive emotions may be resulted from all members' involvement in decision-making and task allocation and monitoring/controlling; and being empowered to complete their tasks. This is reflected in statements such as "*For* technical *matters, I would not take any decision. I will only look at the project management view. I will seek advice from the engineering team, and we will decide together. By doing this, they will feel trusted to take this decision. And if the result is good, I would not hesitate to promote this person to the management team. Mr A has worked hard to solve the problem. Thus, he will feel supported, encouraged, and confident"* (C01, Project Leader) and "*I feel proud as I am being recognised; therefore, I will do my best"* (F01, Project Member). Such positive affective reactions are critical to ensure project virtual team performance as they are useful for controlling conflict and improving the well-being and job satisation of team members (Hoch & Dulebohn, 2013 [21]).

Increased Project Delivery Efficiency. The positive effect of shared leadership on project performance has been suggested in prior studies. For example, Zhu et al. (2018) [16] found that shared leadership improves project delivery efficiency, including project task completion, financial and strategic performance, and project quality. Our findings support this effect. In particular, most of our participants shared the view that practising shared leadership increased their project delivery efficiency (i.e. the likelihood of the project to be completed within the defined scope, budget and schedule). This is reflected in responses such as *"I feel a significant impact in terms of the project schedule. By being given autonomy, we have the freedom to finish the task. However, the leader always monitors the task and provide continuous feedback to control the output to be delivered in the given time"* (J01, Project Member). This effect could be attributed to empowerment: "*Empowerment boosts the team's spirit and confidence level that could lead to the improvement on the achievement, thus, meeting the schedule and target. But could affect the budget in the opposite direction if left uncontrolled"* (I01, Project Leader).

These positive effect of shared leadership on project delivery efficiency can potentially be explained by the positive affective reactions from the team members. In particular, all the positive affective reactions could create a motivational force that encourages the project team to commit to their given tasks, leading to improved project delivery efficiency.

Facilitating Knowledge Sharing. Shared leadership practices (e.g., collaborative decision-making and task allocation) can enhance explicit and implicit knowledge sharing. Explicit knowledge sharing takes place when team members exchange project information or experiences related to project improvement through formal arrangements, such as meetings or training sessions. Meanwhile, implicit knowledge sharing occurs when an information exchange happens through informal discussions. Our findings overall support this effect, as reflected in "*We come from different disciplines. When we have a discussion, our knowledge is increased. We involve* the *senior engineer for discussion to complete each other. I could learn from my team. From discussions with the instrument team, even though I cannot become an expert, at least I understand a little bit about the instruments. From vendors, I learn about workshop management, and especially, how to handle multiple projects"* (M01, Project Leader). Additionally, positive affective reactions (e.g., emotions) triggered by the shared leadership practices can enhance trust development among project virtual team members. This stronger trust is likely to provide great foundation for knowledge sharing.

5. CONCLUSION

Shared leadership is effective in project virtual team management. Our research found that such leadership can be exercised through collaborative decision-making, task allocation/monitoring and empowerment (with boundaries). When being exercised appropriate,y, shared leadership can trigger the positive affective reactions among team members, leading to improved project delivery efficiency and knowledge sharing. This study offers important contributions. Theoretically, it responded to calls for more leadership research focusing on a specific context (i.e., shared leadership in a project virtual team context). As most of the prior leadership literature focused on permanent organizations, our study also added to limited understanding of the shared leadership in a temporary and virtual project team environment; and thus opened up rich research opportunities. Practically, our research offers insights into how shared leadership can be exercised in a project virtual team through collaborative decision-making, task allocation/monitoring and empowerment. These findings provide important references for other projects where shared leadership is considered.

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