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# Swift Trust and Sensemaking in Fast Response Virtual Teams

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## ABSTRACT

Fast-response virtual teams (FRVTs) have been developed as a response to emergent challenges faced by organizations that need to be addressed urgently. Even though FRVTs offer enormous potential in terms of their benefits, their success is not guaranteed. When used, the need for high performing FRVTs has become critical for organizational success. However, there is a lack of detailed understanding of how sensemaking can potentially influence FRVT performance. Drawing on social exchange theory, we identify swift trust as a potential antecedent of sensemaking. In this paper, we report the results of a study that examined the effects of swift trust on sensemaking and the effects of sensemaking on team performance in FRVTs. The study included 20 FRVTs and 80 team participants. Analysis of data shows that FRVTs' swift trust is positively correlated with all three dimensions of sensemaking and only the linguistic and conative development aspects of sensemaking affects FRVT performance.

## KEYWORDS

Sensemaking, time pressure, virtual team, swift trust, virtual collaboration

## 1. Introduction

In today's volatile, dynamic, and social environment, organizations face unprecedented and extreme levels of uncertainty.<sup>1</sup> Crises such as the COVID-19 pandemic add to the intensification of unpredictability in the world. This pandemic has clearly demonstrated the critical relationship between economic health and public health.<sup>2</sup> The enormous impact of the COVID-19 pandemic has reinforced the value of virtual work and virtual teams in businesses across all sectors. Virtual teams have provided a helpful way to keep social distancing and simultaneously maintain the daily operations in organizations. It is the use of virtual teams that has contributed to safeguarding both economic and public health during the pandemic. Organizations have had to quickly

adapt to virtual teamwork, reexamine their business models, and engage in new ways of doing business in response.<sup>3</sup> However, we also know that only 29% of organizations are confident about identifying unexpected events at an early stage.<sup>4</sup> Most organizations respond to unexpected events in an ad-hoc manner by forming **fast-response virtual teams (FRVTs)**.<sup>5,6</sup> It is also an important take away from the perspective of the pandemic that the need for being flexible and agile are critical for the success or even survival of companies during crisis.

As a specific type of virtual teams, FRVTs refer to “*agile virtual teams that embody improvisation, self-organization, and rapid response to urgent, ad-hoc tasks.*”<sup>7</sup> Distinct from conventional virtual teams, FRVTs excel in bringing individuals specialized at various domains to rapidly deal with emergent and urgent situations in an ad-hoc manner.<sup>8,9</sup> At the time of the COVID-19 crisis, agility and flexibility are particularly important for organizations as they attempt to address these sudden and impactful events while ensuring stable operations. In the post-pandemic era, the business environment remains volatile, uncertain, and ambiguous.<sup>10</sup> Although the vaccination coverage is growing, the virus has been constantly changing through mutation, which can even render the vaccines ineffective. Organizations still have to respond rapidly to the changes of the COVID-19 crisis including the new Covid variants. A further observation is that the pandemic has brought unexpected changes and uncertainties in the market across various industries. For instance, in the education sector, the preferences of the student applicants may change when deciding if they will continue their learning online or offline. The universities and institutes had to respond rapidly to these changing market conditions.<sup>11</sup> Similarly, in the sector of tourism, the market conditions have also been transformed by the pandemic given that the intra-pandemic perception can significantly influence the tourists’ post-pandemic travel intention through their attitudes. The travel agency and the government should react swiftly to the changes of the tourists’ attitude in order to better support the local tourism industries. Overall, the pandemic is simply a precursor to a more volatile, uncertain, complex, and ambiguous world that is to be expected in the post-pandemic era.<sup>10</sup> These facts render greater significance of FRVTs in the future.

Unfortunately, these unique traits can also undermine the effectiveness of FRVTs. Given the constrained time resource and the diversified personal backgrounds, FRVTs can easily fail owing to increasing team conflicts, mistrust, and ineffective team coordination.<sup>12,13</sup> Current literature suggests that sensemaking is an important construct to account for team performance, especially when teams are handling unexpected events within limited time.<sup>14–16</sup> Sensemaking itself is a multi-dimensional construct and “the ongoing retrospective development of plausible images that rationalize what people are doing.”<sup>17(p409)</sup> It can help individuals develop coherent, consistent and legitimate thoughts and actions regarding volatile or ambiguous situations.<sup>18</sup> However, FRVTs can

suffer from higher coordination costs and less effective sensemaking processes than traditional virtual teams.<sup>19</sup>

To address the challenges associated with FRVTs, we apply social exchange theory (SET) as the overarching theoretical lens for our research.<sup>20</sup> Based on SET, we identify swift trust as a crucial antecedent of sensemaking processes in FRVTs. Swift trust is established at a team's inception.<sup>21</sup> It can promote individuals' willingness to take risks and share valuable information.<sup>22</sup> This then facilitates the establishment or sustainment of a common ground to conduct efficient communication that is necessary for sensemaking.<sup>19</sup> Hence, we argue that FRVT members require swift trust to foster ongoing sensemaking processes.

There are also mixed findings pertaining to the multidimensional nature of sensemaking. Inductive studies have developed different process models of sensemaking,<sup>16,23,24</sup> whilst empirical and quantitative evidence of the components of sensemaking is very limited.<sup>25</sup> Moreover, the antecedents and effects of specific sensemaking processes remain poorly understood in virtual context.<sup>26</sup> Thus, there is a significant need to advance this line of research in order to capture and assess factors that lead to improved sensemaking processes and team performance in FRVTs.

In order to bridge these mixed findings, we adapt a sensemaking model<sup>24</sup> and empirically test its explanatory power in assessing FRVTs performance. Thus the main research goal of this paper is to enhance our understanding of FRVTs' individual sensemaking processes. Therefore, the major research questions for our work are:

- Does swift trust influence sensemaking and its components?
- Does sensemaking in turn influence FRVTs' performance?

The rest of this paper is organized as follows. The next section describes the theoretical background and previous studies on sensemaking, swift trust in the FRVTs collaboration. Next, we explain our theoretical model and research hypotheses built around the relationships among swift trust, sensemaking, and FRVTs' performance. After that, we describe our research design which involves a scenario-based cross-sectional survey design using simulated tasks. In the fifth section, we present our empirical findings to answer research questions. Lastly, we conclude the paper with discussions of our research findings, limitations, practical implications, and theoretical contributions.

## **2. Conceptual foundation**

### ***2.1. Social exchange theory (SET)***

Social exchange “is voluntary actions of individuals that are motivated by the returns they are expected to bring and typically do in fact bring from others.”<sup>20</sup> The SET paradigm has been applied to understand various workplace behavior,<sup>27</sup> ranging from interactions between leader and member<sup>28</sup> to knowledge sharing or withholding behaviors within teams.<sup>22,29</sup> Recently, scholars have questioned the robustness of SET in explaining the modern workers behavior in modern organizations because of technology advances, globalization, and the evolvement of culture and value system.<sup>30</sup> However, some researchers believe that the original form of SET is abstract enough and requires no change.<sup>31</sup> Given that the fundamentals of the humanity and social exchange rules have not changed,<sup>32</sup> we contend that SET is still a promising and relevant theoretical foundation for our research. SET has shown to be a useful theoretical lens to understand how individuals can be intrinsically motivated to engage in more productive communication and collaboration in various virtual teams, ranging from student virtual team to project team.<sup>29,33</sup> A key tenet of social exchange is reciprocity. It is the reward or compensation that individuals hope to receive after they have provided reciprocal favors that forms the motivation of initial sharing behaviors.<sup>20</sup> However, due to the lack of co-working experience, FRVTs members have no idea if their teammates will compensate for their costs. Unwilling to accept the vulnerability, individuals may withhold their knowledge. Additionally, FRVTs often lack the time to build team norms. Under this circumstance, trust becomes the key for effective social exchanges.<sup>33,34</sup>

## **2.2. Swift trust in fast-response virtual teams (FRVTs)**

Formally, trust can be defined as an “individual’s willingness to be vulnerable to the actions of another person.”<sup>35,36</sup> Trust motivates individuals’ social exchange behaviors by increasing their willingness to accept vulnerability.<sup>20</sup> Specifically, individuals’ trust can foster knowledge sharing and thus team effectiveness.<sup>34</sup> However, trust development is difficult in FRVTs owing to the loss of non-verbal cues and the constraint of time. Individuals can form a special kind of trust “swift trust” when team members have little co-working experience and limited time to develop conventional trust.<sup>37,38</sup>

Similarly, swift trust can also motivate following social exchange behaviors in teams. Swift trust not only affects how virtual team members communicate and interact with each other, but also influences how well the team accomplishes its goals.<sup>39,40</sup> Furthermore, swift trust is important for virtual team members to engage in sustainable cooperation under ambiguous situations.<sup>41,42</sup> It is also an appropriate and important antecedents of team processes, and the relationship can be strengthened by team virtuality.<sup>43,44</sup> Our study proposes swift trust as a crucial antecedent of decomposed sensemaking processes.

### 2.3. Sensemaking in fast-response virtual teams (FRVTs)

Sensemaking is the process through which individuals and groups attempt to explain novel, unexpected, or confusing events.<sup>9</sup> Sensemaking has been a subject of study in numerous domains ranging from organizational culture to power.<sup>23,45</sup> This can be attributed to its simple analytical framework to examine various processes from information gathering to interactions among members.<sup>46</sup> In the field of information systems (IS), sensemaking receive less attention compared with technology acceptance, but it is a promising theoretical lens to explain the process of dealing with uncertainty and the individual cognitions and their use during decision-making process.<sup>47</sup> Specifically, in FRVTs, sensemaking can be one essential behavioral indicator of team member’s engagement in cognizing, understanding, interpreting, and sharing.<sup>48,49</sup>

The concept of sensemaking has been examined at individual level, team level, and organizational level.<sup>26</sup> Specifically, at the individual-level, the sensemaking literature examined each individual’s cognitive processes through which one can comprehend the surroundings and make predictions of the future events; whereas when adopting a team-level perspective, sensemaking has been regarded as a collective processes through which a team manages and coordinates the effort to make sense of the team and the task context.<sup>19</sup> Similarly, sensemaking can be examined at a large scale such as organizations. The organizational sensemaking processes are directly influenced by organizational structures, discourses, culture, identities, and among others.<sup>24,50</sup> A central and shared characteristic of the research streams of sensemaking at all three levels is their focus on the human subjects.<sup>51</sup> Considering the scope of this study and that individuals are the core of collective-social processes, the origin of coordinated action, and the primary authors of interpretations of the tasks. Thus, we made the decision to focus on individual-level to understand sensemaking.

Scholars have proposed diverse sensemaking process models.<sup>16,23,24,47</sup> However, empirical evidence relating to the components of sensemaking is limited.<sup>25</sup> [Table 1](#) summarizes the major research about sensemaking models. The taxonomy in most of the research literature is similar to the one proposed by Basu and Palazzo.<sup>24</sup> Hence, though their sensemaking model is rooted in the topic of corporate social responsibility literature, the model is general enough and can be adapted to other domains.

**Table 1.** Literature Review for Sensemaking Process Model ([Table view](#))

Paper	Method	Context/Application s	Sensemaking processes/components/steps	Definition/Description
Basu and Palazzo <sup>24</sup>	Theoretical exploration	Proposing a process model of	Cognitive processes	Thinking about the organization’s

Paper	Method	Context/Applications	Sensemaking processes/components/steps	Definition/Description
		sensemaking to explain how managers think, discuss and act with respect to their key stakeholders and the world at large (i.e., corporate social responsibilities activities).		relationships with its stakeholders and views about the broader world as well as the rationale for engaging in specific activities that might impact on key relationships.
			Linguistic processes	Linguistic processes involve ways of explaining the organization's reasons for engaging in specific activities, and how it goes about sharing such explanations with others.
			Conative processes	Conative processes involve the behavioral posture it adopts, along with the commitment and consistency it shows in conducting activities that impinge on its perceived relationships.
Kalkman <sup>16</sup>	Scenario-based qualitative study	Exploring the sensemaking questions (sensemaking components) that should be addressed by crisis response teams.	Situational sensemaking	What is happening in this crisis?
			Identity-oriented sensemaking	Who am I in this crisis?
			Action-oriented sensemaking	How does it matter what I do?
Schildt et al. <sup>23</sup>	Review/Theoretical exploration	Examining the effects of power on sensemaking processes.	Automatic sensemaking	Committed and pre-conscious sensemaking process that relies on heuristics that connect salient observations and claims to a categorical understanding of the situation with minimal conscious effort or attention.

Paper	Method	Context/Applications	Sensemaking processes/components/steps	Definition/Description
			Algorithmic sensemaking	Committed and conscious sensemaking process that captures the more attentive formation of rationalizing accounts, carried out in a predictable manner according to preexisting 'algorithms' provided by specific discourses or narrative templates.
			Improvisational sensemaking	Pre-conscious and provisional sensemaking process that lacks conscious attention to inferences yet involves a continued evaluation of inferences, probing actions, and attention to discrepant cues.
			Reflective sensemaking	Deliberate consideration of multiple alternative accounts that relate observations, relevant existing beliefs and future or past actions, enabling rich 'generative' sensemaking.
Ito and Inohara <sup>52</sup>	Case study	Proposing a model of sensemaking process based on case study of executive leaders in a variety of industries.	Experience	What is the event?
			Outcome Sensemaking	How does it turn out? Based on the outcome, how do you make sense?
Zhang and Soergel <sup>53</sup>	Review/Theoretical exploration	Reviewing and extending existing sensemaking models with the ideas from learning and cognition.	The input of task/problem	Analyzing task and determining information gaps.
			Information seeking	Seeking for information/data/structure



Paper	Method	Context/Applications	Sensemaking processes/components/steps	Definition/Description
			Making sense of the information/data	Analyzing and synthesizing the data; creating a representation that fits the data into a faceted classification
			Consuming the instantiated structure	Applying the results to the work tasks: making a decision, executing an action, etc.
			Feedback	The feedback can come in four ways: evaluative, requirement; data, and structure.
			Reflecting on the process and its results	Considering lessons learned; updating individual and group store of knowledge, internal and/or external.
Weick et al. <sup>17</sup>	Case study	Taking stock of the concept of sensemaking by exploring a case of a nurse who need to care for a baby.	Experiencing disruptive ambiguity	Experiencing a raw flow of activity from which individuals may or may not extract certain cues for closer attention.
			Noticing and bracketing	"Inventing a new meaning (interpretation) for something that has already occurred during the organizing process, but does not yet have a name, has never been recognized as a separate autonomous process, object, event" (Magala 1997, p. 324).
			Labeling and categorizing to stabilize the streaming of experience	Labeling and categorizing ignores differences among actors and deploys cognitive representations that are able to generate recurring behaviors to create common ground.
			Using retrospect to make sense of the event	Making connections with past experience to make sense of the present event.

Paper	Method	Context/Applications	Sensemaking processes/components/steps	Definition/Description
			Making presumption about future	Connecting the abstract with the concrete and guiding actions.
			Getting influenced by numerous social factors	Being influenced by discussions, interactions, and other interdependent activities with others.
			Articulating and acting thoughtfully	Talking and taking actions as cycles.
Hahn et al. <sup>54</sup>	Theoretical exploration	Proposing two cognitive frames (i.e., a business case frame and a paradoxical frame) and exploring how differences between them in cognitive content and structure influence the three stages of the sensemaking process, i.e., managerial scanning, interpreting and responding with regard to sustainability issues.	Scanning Interpreting Responding	“Scanning involves information gathering; it usually is considered an antecedent to interpretation and action” (Thomas et al., 1993: 240), “Interpretation is the act of carving out meaning from ambiguous cues and is the very core of the sensemaking process” (Porac & Thomas, 2002: 178). Once managers have interpreted ambiguous sustainability issues based on their cognitive frame, they act on that basis.
Namvar et al. <sup>47</sup>	Review/ Theoretical exploration	Offering a systematic explanation of sensemaking, specifically focusing on its concept, process, strengths, and shortcomings, and discussing ways forward for information systems in contemporary business environments.	Being motivated to engage in sensemaking processes Engaging in three loops (i.e., tasks, sequence, and quality-assurance loops) Considering key factors for the sequential tasks and quality-assurance loops	Identifying and bridging time, space, movement, or its combination gaps that exist between situation and outcome through which sensemaking is applied as a knowledge-based solution-generation mechanism.  Tasks loops consist of information, schema, insight, and product development.  Sequence loops follow two approaches: a bottom-up approach or a top-down approach.

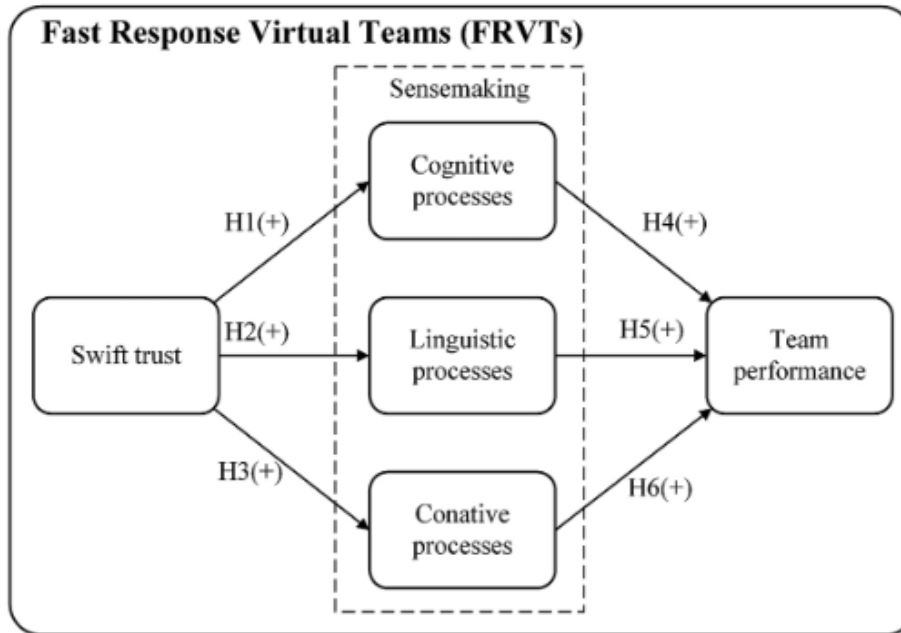
Paper	Method	Context/Applications	Sensemaking processes/components/steps	Definition/Description
				<ul style="list-style-type: none"> <li>Quality-assurance loops consist of sub-loops including foraging and sensemaking loops.</li> <li>The learning loops (i.e., generation, data coverage, and representational shift loops) act as sub-loops within the foraging loops. Data in the form of salient cues and ongoing projects serve as inputs to information development; identity construction, social context, retrospection, and plausibility serve as considerations that must be taken into account by the sense-maker as they affect the interpretations made during insight development; and the development of information received and the quality assurance loops are enacted with the support of business information systems in the form of business intelligence and business analytics.</li> </ul>

Basu and Palazzo<sup>24</sup> demonstrate that corporations engage in cognitive (what firm thinks), linguistic (what firm says), and conative sensemaking processes (how firm tend to behave) that can guide relevant activities. Adapted these sensemaking dimensions to FRVTs, cognitive processes concern team members' mental model and their view about their teams. This cognitive structure is reflected in how individuals perceive the interpersonal processes within their teams. Linguistic processes are associated with the individuals' informal communication, formal discussion, and information sharing behaviors that are intertwined with cognitive processes in FRVTs. Conative processes are action-oriented processes. In FRVTs this involves individuals' behavioral intention, commitment to their teams, and consistencies between actions and plans in their work.

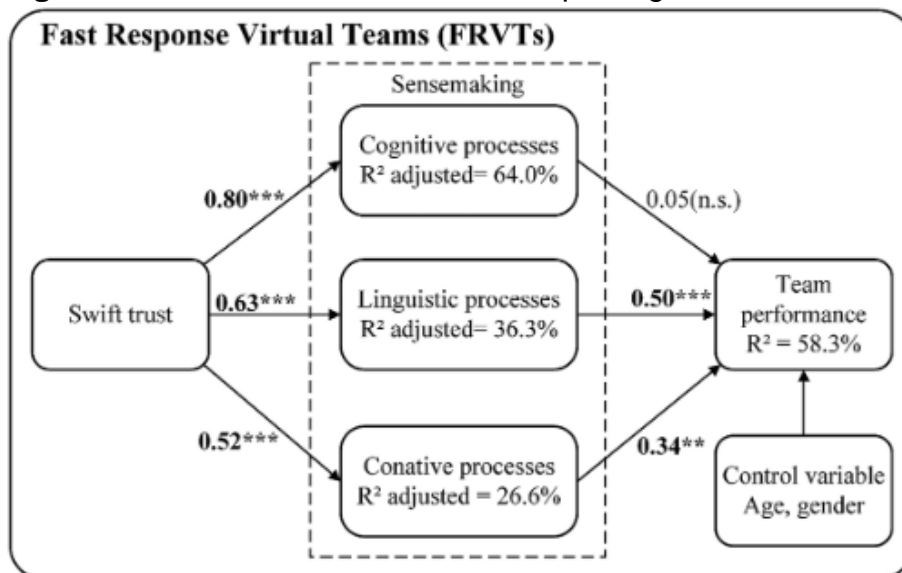
### 3. Research model and hypotheses

#### 3.1. Research model

Sensemaking is the specific focus of our study to account for FRVTs' performance. For the purpose of this study, we define *sensemaking as an individual-level process during which each FRVT member begins actively engaging in cognizing, understanding, interpreting, and sharing within team*. We present our contextualized model in [Figure 1](#) by integrating the notion that sensemaking formed in terms of its three decomposed dimensions affects FRTV performance and that swift trust is an important antecedent of sensemaking processes.



**Figure 1.** Research model of factors impacting FRVTs



**Figure 2.** Hypotheses testing results (\*\*p < .01, \*\*\*p < .001)

As can be seen in [Figure 1](#), based on Basu and Palazzo's<sup>24</sup> model of sensemaking, we propose that an individual's sensemaking is comprised of three dimensions: cognitive, linguistic, and conative. Also, swift trust is introduced as a crucial antecedent contributing to the three key sensemaking processes. From Blau's<sup>20</sup> perspective on SET, swift trust can initiate FRVT members' voluntary social exchange behaviors. This intensifies social exchanges and facilitates the establishment or sustainment of a common ground to conduct efficient communication that is necessary for sensemaking.<sup>19</sup> With better sensemaking processes, FRVTs can reduce ambiguity in tasks and have better performance. We elaborate our hypothesized relationships in the following subsections.

**3.2. Swift trust's influence on fast-response virtual teams (FRVTs)' sensemaking**

Swift trust can contribute to cognitive sensemaking processes. It has been argued that trust is positively related to the accuracy of individuals' cognitive structure pertaining to their teams.<sup>55</sup> Furthermore, swift trust can also improve individual's cognitive processes such as information processing.<sup>43</sup> According to SET, individuals with higher level of trust can feel safer to engage in open communication.<sup>20</sup> This helps individuals acquire a wider range of knowledge regarding teams and cultivate more precise shared understanding, thus fostering individual's cognitive sensemaking.<sup>55</sup>

Likewise, swift trust can enhance linguistic processes through intensified interactions and communication. Swift trust tends to reduce the time and energy that individuals consume to protect themselves from others' behavior<sup>55</sup> thus spending more time on valuable conversation and communication. Higher level of trust can also motivate individuals to express and discuss their personal ideas and task-oriented issues.<sup>25</sup> Another benefit of swift trust is the reduction in potential conflicts and inconsistencies within FRVTs, which facilitates conative processes such as decision-making.<sup>56</sup> Consistency refers to the degree to which the FRVTs perceive the external environment and make appropriate strategy consistently. It reflects the quality of conative sensemaking processes.<sup>24</sup> Trust within teams usually fosters consensus in decision-making,<sup>57</sup> speeds up the decision-making process, promotes a win-win cooperation, and enhances cooperation in teams.<sup>58</sup>

Therefore, swift trust can enhance all of the sensemaking processes (dimensions). Based on the previous arguments and the proposed research model, three related hypotheses are proposed.

***H1. FRVT members' swift trust is positively related to their cognitive development.***

***H2. FRVT members' swift trust is positively related to their linguistic development.***

***H3. FRVT members' swift trust is positively related to their conative development.***

### ***3.3. Sensemaking and fast-response virtual teams (FRVTs) performance***

Generally, sensemaking can help resolve ambiguity and mitigate negative feelings such as stress under time pressure. We expect that this generalized relationship should also hold true in FRVTs. In complex situations, teams cannot rely on intuitive decisions, which can be very risky without review and evaluation.<sup>58</sup> Especially when time is a constraint, information overload is common and risky for teams to form concrete and clear response strategies. Sensemaking processes in teams can reduce ambiguity, facilitate the overall team cohesion, and improve the team performance.<sup>59</sup>

With enhanced linguistic development, individuals in FRVTs are exposed to richer information, and, engage in clearer communication and appropriate information disclosure. Researchers have found that how virtual teams communicate and how they use technology for communication can be correlated with the virtual team's effectiveness.<sup>60</sup> Effective communication (i.e., being open and honest, and having a concern for stakeholders) can facilitate the development of a conversational space where all perspectives are heard and discussed and all possibilities are explored.<sup>61</sup> Consequently, linguistic sensemaking processes can improve team performance.

Similarly, high-quality cognitive sensemaking processes help FRVTs foster team performance by fully leveraging each member's cognitive strengths and enhancing the accuracy of the individual's perceptions of the teams. Sensemaking has been argued as an individual process to produce accurate individual cognition, which in turn improves team performance.<sup>14</sup> Furthermore, researchers have found that interpersonal perceptions of the members in teams can influence team performance.<sup>62</sup>

Conative development (i.e., action-oriented decision-making) can also contribute to team performance. Researchers have shown that under time pressure, appropriate communication patterns or communication strategies are positively related to team effectiveness.<sup>63</sup> Effective and consistent communication strategies using ICT also have positive influence on teams' outcomes, especially in cross-cultural virtual teams.<sup>61</sup> Therefore, we anticipate that consistent and highly committed actions among team members can lead to better team performance.

Based on the prior discussion we posit the following hypotheses.

***H4. FRVT members' cognitive development is positively related to their performance.***

***H5. FRVT members' linguistic development is positively related to their performance.***

***H6. FRVT members' conative development is positively related to their performance.***

## **4. Research design**

We designed a scenario-based cross-sectional survey research study to examine how FRVTs' swift trust development can influence the decomposed sensemaking processes and team performance under time urgency. The scenario-based approach is valid and appropriate in our research because it is a type of predictive- and prescriptive-oriented research design to examine the impacts of external events or shocks, such as crisis or other unexpected situations, on internal activities of teams or organizations.<sup>64</sup> In order to increase the internal validity of the study, we used randomization of subjects and manipulation of "time urgency."

### ***4.1. Participants and data collection***

In this study, 80 subjects were recruited through an online social network in China (i.e., WeChat moments<sup>1</sup>). To recruit participants, researchers along with three graduate research assistants posted an announcement on each of their WeChat moments. The announcement explained the general procedures of the experiment and the remuneration they could get after having completed the experiment and the questionnaires. Specifically, applicants could get a monetary incentive of 50 RMB yuan (approximately \$7.8) regardless of their performance. If individuals were willing to participate in the experiment, they would then contact the researchers or their assistants by WeChat to register. In total, 80 participants contacted the researchers and the assistants. [Table 2](#) shows the demographics of the participants.

**Table 2.** Demographic information ([Table view](#))

Item	Frequency	Percentage (%)
Gender		
Male	17	21.2
Female	63	78.8

Item	Frequency	Percentage (%)
Age range (year)		
21–23	10	12.5
24–26	44	55.0
27–29	25	31.3
30 or over	1	1.3

n = 80; Some percentages may not add up to 100% because of rounding.

Before the experiment, all participants were assigned to teams of four members. Teams were formed so that there were no “known” acquaintances in the same team. This process resulted in 20 teams. All team members could identify a common available time to execute the experimental task via WeChat group.<sup>65</sup> After the formation of the teams, we performed three separate data collection efforts. The first questionnaire was delivered online to all teams when the teams had been just formed. This questionnaire introduced the study purpose and asked basic information about participants. After teams had completed their tasks, the second questionnaire was delivered. All measures of the constructs were in the second questionnaire. We also recorded all the audio coordination processes of all the teams using a software called “LouYue MP3 Recorder.” In the three data collection efforts, all of the 80 participants completed the questionnaires provided valid responses.

#### **4.2. The scenario (simulation task)**

During the study, the virtual teams completed a simulation task.<sup>66</sup> Participants were given a scenario requiring rapid responses before being asked a number of questions about their teams’ reactions to the simulation task. Though the simulation task has been widely used in the western world, in China, individuals have been rarely exposed to similar survival exercises due to different cultural values, which render the classroom more focused on the textbook or case studies but not simulation tasks. We also queried prospective participants when contacting them through WeChat about this question. Most of them had not heard and/or participated in similar simulation tasks before. Only three participants had heard about the task but had not engaged in the simulation tasks before. Specifically, the simulation task asked the teams to imagine themselves being trapped in the Ocean on a boat with 15 items, such as a rope, water, etc. Each team had to collectively decide a rank order of these 15 items based on their level of importance to them. Participants were originally told to be finish the tasks within 35 minutes (we ran a pilot study and found that 35 minutes was a reasonable time to finish the task). When teams had worked on their tasks for 10 minutes, they were told



by the researchers that they only had 10 minutes left shortening the time to complete tasks by 15 minutes. This situation posed unexpected time urgency on all of the teams and required them to respond rapidly to the task.

### **4.3. Technology**

All teams were asked to only collaborate through WeChat. This collaboration tool has multiple capabilities, including video chatting, voice chatting, text messaging and file sharing. All textual and audio interactions were recorded by using a software called “LouYue MP3 Recorder.”

### **4.4. Measurement**

Five constructs, including swift trust, three sensemaking processes (i.e., cognitive, linguistic, and conative), and team performance were measured via a survey. All constructs were measured using multiple items on 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). The measures for the five constructs were adapted from previous research. The measurements are shown in [Appendix](#). In particular, based on Basu and Palazzo<sup>24</sup> study, we operationalize the cognitive dimension of sensemaking as virtual teams’ interpersonal process, the linguistic dimension of sensemaking as team knowledge sharing and team mutual awareness, and the conative dimension of sensemaking as teams’ process conflict and shared temporal cognition. Our dependent variable, ‘team performance,’ was measured using self-reported data based on the scales adapted from Wageman et al (2015).<sup>67</sup>

## **5 Analysis and results**

### **5.1. Reliability and validity analysis**

To evaluate the reliability and validity of the data we built and tested a 23-item measurement model with five latent constructs using the sample data. Since our model contains both reflective and formative measures, we followed two different approaches for evaluating the reliability and validity of the measures particularly.

The reflective constructs in the model were swift trust, cognitive and team performance. To achieve enough indicator reliability, we deleted CG1 (0.560) and ST3 (0.677) for their loadings were not in the acceptable range. The deletion leads to an increase in composite reliability. For the reflective constructs, we used Cronbach’s Alpha and composite reliability to assess the internal consistency reliability. As shown in [Table 3](#), after the deletion of CG1 and ST3, all of the reliability coefficients exceed 0.7. Convergent validity was measured using the average variance extracted (AVE). All of the three scales had AVE exceeding 0.5. Discriminant validity is assured when the

squared root of the AVE for each construct is higher than the bivariate correlations between that and all other constructs. In [Table 3](#), this condition was met for all three of our reflective constructs.

**Table 3.** Reliability and Validity Results of Survey ([Table view](#))

	Cronbach's $\alpha$ (> 0.7)	Composite reliability (> 0.7)	AVE (> 0.5)	1	2	3	4	5
1. Swift Trust	0.88	0.93	0.81	0.90				
2. Cognitive	0.91	0.93	0.78	0.80	0.88			
3. Conative	–	–	–	0.52	0.58	–		
4. Linguistic	–	–	–	0.61	0.64	0.54	–	
5. Team Performance	0.82	0.89	0.73	0.53	0.56	0.63	0.72	0.86

n = 80; Conative and linguistic were measured formatively and cannot calculate Cronbach's  $\alpha$ , composite reliability, and AVE.

The formative constructs of our model were linguistic and conative sensemaking dimensions. We assessed the level of collinearity on the two constructs using VIF. Measures on both of the two scales' VIF did not exceed 5. Then we tested the significance and relevance of the indicators. Significance testing for each item was performed using the bootstrap resampling procedure with 5000 resamples and a significance level of 0.05. We deleted LG2 ( $p$  value = .61), CN1 ( $p$  value = .16), CN2 ( $p$  value = .91) and CN3 ( $p$  value = .78) for they didn't contribute to their construct neither relatively nor absolutely.

After the reliability and validity test of the measures, we had confidence that our measurement scales were theoretically and empirically adequate. Descriptive statistics of the constructs are presented in [Table 4](#).

**Table 4.** Descriptive Statistics of the Constructs ([Table view](#))

Construct	Min	Max	Mean	Standard deviation
1. Swift trust	1.00	5.00	3.96	0.70
2 Cognitive	1.80	5.00	4.26	0.62
3. Linguistic	2.40	5.00	3.95	0.46
4. Conative	2.83	5.00	3.96	0.51
5 Performance	1.33	5.00	4.04	0.72

n = 80.

## 5.2. Common method bias

All self-reported data faces a potential risk of common method bias as a result of consistency motif, social desirability, etc.<sup>68</sup> Following the instructions of Podsakoff, MacKenzie,<sup>69</sup> we employed a statistical remedy to identify the impact of common method bias. Specifically, we estimated common method bias in our study by using two methods.

First, we evaluated common method bias using Harman’s single-factor test.<sup>70</sup> Evidence for common method bias is believed to exist when a single-factor accounts for more than 50% of the variance in the variables or a single factor emerges from the analysis.<sup>71</sup> Given that the test extracted more than one factors and the most variance explained by the first factor is 38.59%, common method bias seem unlikely to contaminate our results. Second, the highest correlation between the five constructs in [Table 3](#) is 0.80, which is lower than 0.90. Therefore, our constructs did not indicate any highly correlated factors.<sup>72</sup> Taken together, our two data analyses suggest the absence of common method bias.

### 5.3. Hypothesis testing

We first assessed collinearity with the structural model using VIF. All constructs’ VIFs did not exceed 5, indicating no collinearity issue in our model. Then we used SmartPLS 3.0 to test the significances and strengths of each hypothesized effect in our model and variance explained (adjusted R<sup>2</sup> value). We used the bootstrap resampling with 5000 samples at the 5% significance level. The results showed that except for hypothesis H4, all other experimental hypotheses were supported. Furthermore, this model explains a significant amount of variance for virtual team performance as indicate by the R<sup>2</sup>value of 0.59.

Swift trust had significant effects on cognitive ( $\beta = 0.80, p < .01$ ), linguistic ( $\beta = 0.63, p < .01$ ), and conative ( $\beta = 0.52, p < .01$ ) dimensions of sensemaking, providing support for H1, H2, and H3. Linguistic ( $\beta = 0.50, p < .01$ ) and conative sensemaking ( $\beta = 0.34, p < .01$ ) had a significant effect on team performance and jointly explained 58% of the variance in the dependent variable, lending strong support for H5 and H6. No significant effect was found between cognitive sensemaking and team performance ( $\beta = 0.05, p = .86$ ). The results are summarized in [Table 5](#).

**Table 5.** Hypothesis Test Results ([Table view](#))

	Path	Pathcoefficient	p value	Supported
<b>Hypotheses</b>				
H1 (+)	Swift trust → Cognitive	0.80	0.000***	Yes
H2 (+)	Swift trust → Linguistic	0.63	0.000***	Yes
H3 (+)	Swift trust → Conative	0.52	0.000***	Yes
H4 (+)	Cognitive → Team performance	0.05	0.860	No

	Path	Pathcoefficient	p value	Supported
H5 (+)	Linguistic → Team performance	0.50	0.000***	Yes
H6 (+)	Conative → Team performance	0.34	0.008**	Yes
<b>Control variables</b>				
<b>Age</b> → Team performance		0.02	0.643	No
<b>Gender</b> → Team performance		-0.061	0.491	No

n = 80, \*\*p < 0.01, \*\*\*p < 0.001.

To test the mediation role of cognitive, conative and linguistic processes for sensemaking, we performed a follow-up test by linking swift trust and team performance directly without the three constructs and related paths. The link was found to be significant ( $\beta = 0.57$ ,  $p < .01$ ), supporting that swift trust could influence performance and the total effect was 0.57. The variance accounted for (VAF) is the size of the indirect effect regarding with the total effect. Indirect effects via cognitive, conative and linguistic were 0.04, 0.17, 0.32. Hence, VAFs for cognitive, conative and linguistic were 0.07, 0.30, 0.56, indicating partial mediation between swift trust and team performance via conative and linguistic dimensions of sensemaking. No mediation effect exists via the cognitive dimension (VAF < 0.2). The results for the mediation test are shown in [Table 6](#) and the hypothesis testing results for our research model are displayed in [Figure 2](#).

**Table 6.** Mediation Test Results ([Table view](#))

Antecedent	Mediator	Total effect	Indirect effect	VAF	Mediation effect
Swift trust	Cognitive	0.566***	0.039 (n.s.)	0.07	No mediation
	Linguistic		0.315**	0.56	Partial mediation
	Conative		0.171*	0.30	Partial mediation

n = 80, \*p < 0.05, \*\*p < 0.01.

To achieve adequate statistical power, we included age and gender as control variables in the model. Specifically, we controlled the influence of age and gender on performance.<sup>73</sup> According to the results, the two control variables are statistically nonsignificant. With respect to the hypothesized core relationships between sensemaking processes and performance, age and gender pose limited influence on the dependent variable.

## 6. Discussion

### 6.1. Discussion of results

FRVTs are increasingly used in organizations for dealing with the intensified uncertainty and ambiguity. Rapid response to unexpected events has become critical for virtual teams. Sensemaking has long been deemed as an effective theoretical lens to explain the team processes and performance, especially when teams are under great ambiguity and time pressure.<sup>16</sup> Because of the dispute on the level of analysis and the emphasis on individuals in sensemaking literature,<sup>51</sup> our research focused on the individual-level phenomena in FRVTs. Outside this issue, extant research also shows mixed perspectives regarding the multi-dimensional nature of sensemaking.<sup>16,23,24</sup> Meanwhile, empirical and quantitative evidence on the components of sensemaking is limited.<sup>25</sup> Therefore, studies on the antecedents of the specific decomposed components of sensemaking is also scarce. In order to address these research gaps, our study employed social exchange theory (SET) as the overarching theoretical lens to further our understanding of FRVTs' sensemaking processes and performance.

The study results demonstrate a strong positive relationship between swift trust and all three dimensions of sensemaking – the cognitive (H1), the linguistic (H2), and the conative (H3) development among teams, consistent with social exchange theory. Among the three core processes of sensemaking, we confirmed that the cognitive and linguistic dimensions of sensemaking are highly correlated with FRVTs' swift trust development, while the conative dimension's correlation with swift trust is moderate. The FRVT members will be more willing to engage in sharing of cognition, understandings, and interpretation and coordinating of knowledge and actions when they are able to rapidly build up trust among member. These findings are consistent with prior empirical studies that has indicated that trust is even more important in virtual teams to improve performance by facilitating risk taking behaviors such as investment of effort (e.g., cognitive sensemaking), confidential information sharing and open discussion (i.e. linguistic sensemaking), and contributing to team coordination and cooperation (i.e., conative sensemaking).<sup>43</sup> Our findings, in conjunction with those of the empirical research, highlight that trust as well as swift trust are primary facilitators for team members to engage in sensemaking processes, especially for the cognitive and linguistic sensemaking processes.

At the same time, we found the positive relationships between linguistic (H5) sensemaking, conative sensemaking (H6) and FRVTs performance but an unexpected insignificant effect of cognitive sensemaking on performance. This finding is consistent with previous empirical studies suggesting that performance relies on coordination, cooperation, knowledge sharing, and information elaboration,<sup>33,43,74</sup> which are exactly related to the linguistic and conative dimensions of sensemaking. Despite support for the effects of linguistic and conative sensemaking on FRVTs performance, cognitive dimension of sensemaking is found to have an unexpected null effect on FRVTs performance. According to prior studies, this null effect of cognitive sensemaking may

not be surprising given the less significant impact of team-oriented activities on team performance compared with task-oriented activities.<sup>75,76</sup> Under time pressure, FRVTs have limited time of fully engaging in cognizing on informational cues in environment. As a result, FRVTs performance is more likely to be determined by how efficiently and effectively individuals communicate on task-related information and FRVTs operate, which render most of the variance of performance attributable to the linguistic and conative sensemaking but not cognitive sensemaking. This finding is in accordance with the findings of Widmann and Mulder,<sup>77</sup> who demonstrated that a team's cognitive development cannot significantly contribute to team efficiency, whereas the shared cognition indeed poses a positive influence on team effectiveness. Our findings, combined with those of Widmann and Mulder,<sup>77</sup> highlight that the cognitive components are not silver bullets as compared with linguistic and conative elements of sensemaking.

Overall, our study supports the following key conclusions:

- Linguistic and conative processes are the primary drivers of team performance in FRVT settings. Individuals are more likely to present higher positive perceptions of team performance when they have engaged in linguistic and conative sensemaking processes.
- Cognitive process is found to have a non-significant influence on virtual team performance.
- Individuals are more likely to perform sensemaking processes, especially cognitive and linguistic processes, when they have established swift trust.

## **6.2. Implications for research**

On the theoretical front, our study draws from the conceptual sensemaking process model from Basu and Palazzo<sup>24</sup> to decompose sensemaking into its three dimensions. We also extend upon the sensemaking literature by providing empirical support for the dimensions of sensemaking and its impact on team performance. Because uncertainty and ambiguity are common in today's business environment, sensemaking processes are of great importance for individuals, teams, and organizations. We contend that the decomposed or dimensional view of the construct offers a better understanding of virtual teams in a volatile environment. Extant research on sensemaking present mixed findings pertaining to its multi-dimensional nature.<sup>16,23,24</sup> We have empirically tested one set of dimensions for sensemaking and have established its explanatory power on virtual team performance.

On the empirical front, our study contributes to the operationalization of sensemaking in the context of FRVTs. Until now, previous studies applying sensemaking have

seldom operationalized and empirically examined sensemaking and its sub-dimensions and their impact on performance.<sup>25</sup> Our study provides a valuable foundation for future research to replicate and improve the operationalization of sensemaking. We demonstrate that linguistic and conative processes are more predictive of virtual team performance. This is important because if organizations are to reap benefits from FRVTs, it is necessary to understand factors that influence how team inputs are processed into outcomes.

Another contribution of this study is the identifying swift trust as an important driver of the sensemaking processes. By adopting SET, we empirically examined the role of swift trust on sensemaking. We have empirically shown that swift trust is related to different facets of sensemaking activities in predicting FRVT performance. The effect of swift trust is significant across all sensemaking processes. Built upon this research, future studies can explore other important drivers contributing to each of the three sensemaking processes.

Besides testing the antecedents and core processes involved in sensemaking, our study further extends sensemaking and FRVTs literature by introducing sensemaking in FRVTs. We find that two of three sensemaking processes significantly influence FRVTs performance. Specifically, linguistic and conative processes are found to positively influence a FRVT's performance. On the other hand, cognitive processes can have a weak effect on performance. Overall, our research has proved that Basu and Palazzo's<sup>24</sup> model can be used to explain the sensemaking processes and team performance in FRVT setting. These findings shed new light on the critical role of sensemaking in FRVTs.

### ***6.3. Implications for practice***

For practice, we suggest that organizations and FRVTs leaders should enhance swift trust formation at the transition phase. The positive influence of swift trust on FRVT performance indicates that it is critical to build swift trust at the beginning of virtual team's formation even when teams are under great time pressure. Without well-established swift trust, members can consume more time or even fail to establish social exchange relationships to function effectively within teams, which is unacceptable when teams are facing with great time pressure.

Our analysis shows that swift trust is critical for all three sensemaking processes and can enhance knowledge sharing and other team processes. Although not all facets of sensemaking directly pose positive and significant influence on team performance, it is still worthwhile for leaders to pay attention to sensemaking activities. We recommend that leaders can promote sensemaking activities through frequent and enhanced communication combined with intervention for building swift trust. If team members

perceive that their teammates are trustworthy, they will engage in knowledge sharing activities more frequently and achieve higher communication quality. This in turn help members share similar cognitive structure and build commitment to teams and task goals, directly leading to promotion of team performance.

#### **6.4. Limitations and future research**

Our study is limited in the following aspects. First, due to the experimental scenario-based nature of the study, our results can be less generalizable in real-world teams and organizations as teams will encounter more sophisticated situations. Further research needs to be conducted using a field study research design to achieve better generalizability. Besides, our research is exploratory and is limited in terms of delineating complex activities in the teams. Future research should include promising constructs to generate interesting findings in the field of information systems. For instance, scholars have called for more attention paid to chronic disposition and situational priming to provide new insights on information processing.<sup>78</sup> To achieve insightful findings, researchers can employ data partitioning techniques to strike the balance between the limited data and the promising but sophisticated research design.<sup>79</sup> Second, our dependent variable “team performance” was measured using self-reported data based on the scales adapted from Wageman et al. (2015).<sup>67</sup> Therefore, our research may be subject to common method bias. Although our analysis confirmed that the common method bias had limited impacts on the results, future research should use objective data to prevent the bias and replicate our research. Third, our study only examines highly virtual teams (i.e., FRVTs). Marlow, Lacerenza<sup>80</sup> has pointed that the degree of virtuality can greatly moderate the relationship between team communication, emergent states, and team outputs. Therefore, the conclusions in our study may not be the case under distinct levels of virtuality. Future study can reexamine our research model in virtual teams with varied level of virtuality. Fourth, in our study, cognitive development does not seem to have a direct and significant relationship with team performance. This can be attributed to the effect of other individual cognitive constructs, such as chronic disposition and situational priming,<sup>78</sup> on sensemaking processes. Future studies can verify the sensemaking model across various context and tasks to further explore or illuminate the impact of individual cognitive constructs and their interactions on the information processing and sensemaking processes.

## **7. Conclusion**

FRVTs are increasingly used in various domains. Although FRVTs can provide benefits such as reduced costs, access to global talent, and rapid response to unexpected



events, these teams are often face greater challenges compared with conventional teams. Against this backdrop, this paper adopted social exchange theory (SET) to identify swift trust as a driver of sensemaking and contextualized the conceptual sensemaking process model by Basu and Palazzo<sup>24</sup> for FRVTs. Our results show that individuals who establish swift trust toward their teams are more likely to perform cognitive, linguistic, and conative sensemaking processes. Furthermore, linguistic and conative processes pose significantly positive influence on FRVTs performance. These findings imply that managers should intervene in FRVTs to promote swift trust and facilitate sensemaking processes. By operationalizing and demonstrating the effect of swift trust on decomposed sensemaking processes and the effect of sensemaking on team performance, this study opens the door for future research to investigate not only sensemaking processes as a holistic construct, but as a sophisticated structure of sensemaking in teams and organizations.

## Notes

WeChat is a Chinese multi-purpose messaging, social media and mobile payment app developed by Tencent. WeChat moments can be seen as an online social community where users can share anything in their lives with their friends.

## Disclosure statement

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## Appendix. Measurement

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Construct	Code	Item	Source
Swift trust	ST1	Team members quickly trust and harmonize with each other.	Kanawattanachai and Yoo, <sup>40</sup> Daniel, <sup>81</sup> Isaksen and Lauer <sup>82</sup>
	ST2	Team members soon have a tacit understanding, easy to communicate with each other.	

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Construct	Code	Item	Source
	ST3	Team members quickly get along and joke with each other.	
	ST4	Team members quickly believe that they will cooperate with each other and work carefully.	
Cognitive	CG1	My relations with other team members are strained.	Wageman et al. <sup>67</sup>
	CG2	I enjoy talking and working with my teammates very much.	
	CG3	The chance to get to know my teammates is one of the best parts of working on this team.	
	CG4	I enjoy the kind of work we do in this team.	
	CG5	I am very satisfied with this team.	
Linguistic	LG1	Insufficient communication between our team led to great errors.	MacMillan et al., <sup>83</sup> Chuang et al. <sup>84</sup>
	LG2	To what extent did team members provide relevant information to another team member, in a pro-active way, without that team member having to ask for it?	
	LG3	Our team members will think ahead of time about the needs of other team members and provide assistance.	
	LG4	Our team members will adjust the personal tasks of other members to prevent overloading.	
	LG5	Our team's behavior is overall coordinated.	
Conative	CN1	Many of our team members do not agree with others' role assignments.	Behfar et al., <sup>85</sup> Gevers et al. <sup>86</sup>
	CN2	Members often have inconsistent opinions on how to complete team tasks.	
	CN3	There are many conflicts in the distribution of tasks in our team.	
	CN4	Our team has similar ideas on how to make better use of time.	
	CN5	Our team agreed on how to allocate the time available.	
	CN6	Our team has similar ideas about the time it takes to complete certain tasks.	
Team Performance	TP1	Our team can complete the mission objectives within the planned time.	Wageman et al. <sup>67</sup>
	TP2	The tasks accomplished by our team reached the standard.	
	TP3	Our team works very efficiently.	