






The linkage between team communication, team motivation and search and rescue team performance



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Research Project Registration:

Project Number: FRGS/1/2018/SS03/UITM/02/16

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Dates:

Received: 10 Jan. 2023
 Accepted: 24 Aug. 2023
 Published: 09 Nov. 2023
 Republished: 01 Mar. 2024

How to cite this article:

Zawawi, A.A., Halim, N.A., Kamarunzaman, N.Z., Zawawi, A.A., & Halim, F.W. (2023). The linkage between team communication, team motivation and search and rescue team performance. *SA Journal of Human Resource Management/SA Tydskrif vir Menslikehulpbronbestuur*, 21(0), a2217. <https://doi.org/10.4102/sajhrm.v21i0.2217>

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Orientation: This study examined the linkage between team communication, team motivation and search and rescue (SAR) team performance.

Research purpose: The study intends to investigate the impact of selected team factors that affect team performance, while adding to the scarce studies done on SAR team performance (especially in Malaysia).

Motivation for the study: Search and rescue teams are skilled elite teams that can reflect the true characteristics of a team's performance.

Research approach / design and method: The study comprised 850 individual team members who were aggregated into 209 teams. Teams were among the SAR teams of the Malaysian Fire and Rescue Department. The study used a quantitative approach, employing the purposive sampling technique. The relationships between team communication, team motivation and SAR team performance were analysed using the structural equation modelling (SEM).

Main findings: The results indicate that team communication affects SAR team performance; however, the relationship is not mediated by team motivation.

Practical/managerial implications: Team communication is vital to the achievement of teams' objectives. However, in life-and-death situations, which are usual for SAR teams, team motivation does not have a role in how communication affects the teams' performance. Team leaders and the managers of SAR teams need to focus on effective communication techniques in order to achieve excellent performance. This includes the use of appropriate verbal and non-verbal communication.

Contribution/value-add: This study adds value to the current literature on team performance, specifically SAR team performance.

Keywords: team communication; team motivation; team performance; search and rescue teams; Malaysia.

Introduction

Search and rescue (hereafter labelled as SAR) team performance is the ability of the team to meet the organisational goals in the aspect of targeted time (Rapp et al., 2013). According to Salas et al. (2008), team performance is defined as a goal-directed process derived from the collective efforts of team members. This process encompasses various activities such as team task work, collaboration with other teams and other team-level endeavours aimed at producing products and services. The presence of teamwork within an organisation has been found to enhance organisational efficiency and effectiveness (Chung-An & Hal, 2010). Teamwork involves a cooperative approach that motivates individuals to work together towards achieving common objectives. In the context of SAR operations, teams are composed of individuals possessing the requisite skills and knowledge to locate individuals in distressing situations, such as natural disasters, as well as mountain or desert rescues (Zailan et al., 2013). SAR teams manage SAR operations on a large scale, finding and rescuing people missing, and effectively dealing with disaster management (Official Website: Jabatan Bomba dan Penyelamat Malaysia [JBPM], 2020). Search and rescue teams are often the most active, elite, skilled and equipped

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Note: The article has been republished due to misleading text found in the data analysis section, which the publisher failed to correct during proofreading. The data analysis segment has now been updated. This correction does not alter the study's findings of significance or overall interpretation of the study's results. The publisher apologises for any inconvenience caused.

teams. They remain in constant readiness, go through SAR training courses, pass special SAR exams to become experts and personally train their rescue dogs that are allowed to participate in the SAR operation (Official Website: Jabatan Bomba dan Penyelamat Malaysia [JBPM], 2020). The performance of SAR teams can measure whether the teams are excellent, modest or unsatisfactory in carrying out their duties. In making sure the team's performance can be maintained, programmes and trainings are planned to increase and upgrade team members' skills and expertise related to SAR operating techniques or methods in line with the latest technology (JBPM, 2018). They also ought to have progressive team communication that can maintain the teams' morale and motivation. One of the essential elements of team performance is team communication. Team's daily routine deals with various risks and unsafe and dangerous environments (Irwan, 2019). Team communication plays a crucial role in influencing team morale, productivity and engagement, yielding either positive or negative outcomes. Effective communication within a team has a positive influence, while poor communication adversely affects team performance, hindering their ability to carry out tasks efficiently. When team communication is robust, it fosters a favourable work environment that significantly impacts the well-being of team members and directly contributes to the organisation's overall success (Kim & Shin, 2021). Moreover, teams that are satisfied with their work environment tend to exhibit higher levels of productivity and make fewer errors during operations (Sharifah et al., 2012).

Comprehending SAR team performance in Malaysia holds vital significance for the nation's disaster preparedness and response capabilities. This understanding can pave the way for the development of better-trained and equipped teams, optimising operational efficiency, and ultimately bolstering the nation's ability to save lives and mitigate the impact of emergencies and disasters. However, the field of team performance research in the context of SAR teams in Malaysia is currently confronting several critical gaps that demand attention. Firstly, there is a lack of research on the Fire and Rescue Department of Malaysia (FRDM) SAR team performance in the human resources field (e.g., Beersma et al., 2003; Zailan et al., 2013). Most existing studies on SAR teams have been conducted in military or private organisations. Secondly, there is a limited understanding of how FRDM SAR teams perform in their real work environments, which are often hazardous and different from the safer conditions studied in other team performance research (e.g., Chandrasekar, 2011). Thirdly, the literature lacks comprehensive team performance models that have been developed specifically for SAR teams (e.g., Salas-Vallina et al., 2020). Finally, there is a dearth of studies exploring the mediating role of team motivation in the relationship between team performance and its predictors. Most research has treated motivation as a dependent or independent variable, but it is important to understand how motivation can mediate this relationship (e.g., Soltanzadeh et al., 2017). Addressing these gaps is essential

to enrich our understanding of team performance dynamics and advance the literature on FRDM SAR teams in Malaysia.

Search and rescue team performance

Search and rescue teams play a critical role in conducting rescue missions and are at the forefront of such operations. Within the scope of this study, team performance in SAR pertains to the collaborative efforts and dedication exhibited by SAR teams, which enable them to work towards achieving their shared goals and objectives, specifically the preservation of victims' lives during SAR missions. According to Morgeson et al. (2005), SAR team performance encompasses all missions and operations formally undertaken by the teams, as these endeavours directly impact their ability to accomplish their goals. Several key elements contribute to the development of team performance in SAR teams, as identified by Katzenbach and Smith (1993). The first element is the establishment of urgency, highlighting the critical importance of SAR teams taking prompt action within the initial 72 h following a disaster to prevent loss of life (Suhaimi et al., 2014). The second element is the presence of demanding performance standards, wherein SAR teams adhere to their established standard operating procedures (SOP) to meet the required level of performance. Additionally, effective leadership direction is another crucial element in SAR team performance, as leaders' instructions and guidance to team members are pivotal in saving lives during SAR operations. Salas et al. (2008) stated that team performance is a goal-directed process drawn from team members. It includes the process of team task work, teamwork with other team and other team-level activities to produce products and services. In this context of SAR missions, team performance also depends on team collaboration with other agencies in which they work together to achieve shared goals. Idris and Adi (2019) and Hoegl and Parboteeah (2003) added that team performance is supported by five dimensions, which are: (1) communication, (2) coordination, (3) team contribution, (4) mutual support and (5) cohesion between each member of the team. Idris and Adi (2019) claimed that team communication is the most critical dimension of these five dimensions of team performance. This is because effective communication between team members is believed to have a positive impact on performance. The presence of team leadership specifically induces performance. Leaders' support and commitment are critical in assisting team members to perform better. Leadership highlighted the personal and interpersonal dynamics of how individuals in the team influence each other towards achieving organisational goals (Allen, 2018). Poor communication poses a significant problem for SAR teams in Malaysia, impacting team motivation and performance. Difficulties in tracing accidents, SAR movements and incident locations arise because of ineffective communication. Additionally, poor leadership within SAR teams leads to delays in the SAR process and a lack of coordination among team members, further hindering motivation and overall performance. Geographical and working conditions also

present challenges, limiting the team's movement during SAR operations. Moreover, the coronavirus disease 2019 (COVID-19) pandemic has introduced new responsibilities, such as handling COVID-19 cases, increasing the burden of work for SAR teams and further affecting their performance. Addressing these communication-related challenges is vital to bolster team motivation and enhance the overall performance of SAR teams in Malaysia, as their life-saving role demands optimal efficiency.

Antecedents and theoretical foundation of search and rescue team performance

Social exchange theory (SET) is a theory that explains how people interact with each other and how these interactions can lead to positive or negative outcomes. This theory suggests that people are motivated by the expectation of rewards and deterred by the expectation of punishments (Cropanzano & Mitchell, 2005; Mora Cortez & Johnston, 2020). In the context of team performance, SET suggests that team members are more likely to communicate effectively, be motivated and perform well if they believe that they will be rewarded for doing so. The link between SET and team performance is becoming more well established. For example, a study by Cropanzano and Mitchell (2005) found that team members who perceived that they were being treated fairly by their leaders were more likely to be engaged in their work and to perform at a high level. Another study by Van Der Wagen (2020) found that team members who felt that they were being supported by their teammates were more likely to be motivated to perform well. In the context of SAR teams, SET suggests that effective communication, motivation and performance are all essential for success. SAR teams must be able to communicate effectively in order to coordinate their efforts and to share information quickly and efficiently. They must also be motivated to perform well in order to save lives. And, they must be able to perform at a high level in order to be successful in their missions. Social exchange theory provides a useful framework for understanding how these factors can interact to influence team performance. By understanding the principles of SET, SAR teams can create a positive team climate that fosters effective communication, motivation and performance. Team leaders can promote effective communication among team members by facilitating regular meetings, encouraging brainstorming sessions and cultivating an environment of transparency and open dialogue. Team leaders can also bolster team motivation by establishing clear objectives, providing consistent feedback and acknowledging team members' contributions, thereby fostering a sense of purpose and appreciation. Motivated SAR teams are more likely to be successful in their missions (Qomariah et al., 2020). Team leaders can optimise team performance by ensuring access to necessary resources, fostering a supportive atmosphere and addressing conflicts promptly and efficiently. These measures empower the team to concentrate on their objectives and achieve optimal outcomes.

Team communication

Team communication is defined by Liu et al. (2020) as the interaction of one person with another person within a team. When teams communicate through sentiments and attitudes, a relatively small portion of the entire message is conveyed through the use of words. Different forms of communication provide various outcomes for organisations. A SAR team can only follow instructions when they can comprehend what their leader is saying. In a mission as crucial as saving lives, individual work is insufficient. Collaborative efforts among team members are imperative, as the tasks involved are based on their respective knowledge and proficiencies (Martins et al., 2004). For example, in SAR operations involving rivers or sea, team members with specialised knowledge in water-based rescue, specifically divers from the water resource team (WRT) unit, will be assigned to handle the tasks. Consequently, it is vital for every team member to assume responsibility and maintain effective communication to facilitate rational decision-making processes (Huo et al., 2018). Effective communication in SAR operations is essential for a number of reasons. Firstly, it allows team members to share information and coordinate their efforts. This is critical in SAR operations, as team members often need to work together quickly and efficiently to save lives. Secondly, effective communication allows team members to build trust and rapport. This is important, as team members need to be able to rely on each other in high-stress situations. Thirdly, effective communication allows team members to resolve conflicts and disagreements. This is vital, as conflict can quickly derail a SAR operation. The style of communication used in SAR operations can have a significant impact on team performance. A clear and concise communication style is essential for ensuring that team members understand the information they need to complete their tasks. Additionally, a communication style that encourages open and honest communication can help to build trust and rapport among team members.

Team motivation

Team motivation is a key factor in team performance. It is the desire of a team to perform their best, derived from intrinsic or extrinsic motivation. Team motivation can be enhanced by effective team communication. When team members communicate effectively, they are more likely to be motivated to work together and achieve their goals. The significance of team motivation as a mediator in the relationship between team communication and team performance has been widely acknowledged in previous studies (Al-Jedaia & Mehrez, 2020; Dei et al., 2020; Qaiser Danish et al., 2015). Within the context of SAR teams, team motivation acts as a source of inspiration and encouragement, motivating SAR teams to deliver their best performance during operations, thus significantly enhancing overall team performance (Salifu & Agbenyega, 2013).

Team motivation refers to a process that initiates from physiological and psychological needs, driving individuals to

strive towards specific performance objectives (Caillier, 2016). When teams experience positive support and operate in a systematic work environment, they develop a sense of engagement. Engaged team members exhibit higher levels of enthusiasm and dedication, which positively influence their performance and responsibilities. This holds true for SAR teams, who demonstrate a strong and passionate drive to carry out SAR operations, even in hazardous and challenging work environments (Sharifah et al. 2012). Therefore, when the motivation of a SAR team is high, their performance is enhanced despite facing obstacles like dangerous conditions, accidents, and insufficient tools and equipment. Team motivation not only is crucial for the teams themselves but also contributes to productivity improvement, enhanced management practices, increased accountability and fostered trust within the team dynamics (Albrech, 2011). Motivation serves as the driving force that compels teams to apply their knowledge and skills. Without motivation, teams may withhold their performance, even if they possess the necessary competence. Motivation prompts teams to invest greater cognitive effort, leading to improvements in both the quality and quantity of their work. Consequently, motivational performance gaps arise when individuals encounter resistance in repeating the same tasks or attempting new ones. Motivated SAR teams are driven by a strong desire to achieve their goals, even in challenging situations, leading to enhanced performance and overall success in SAR missions. The understanding of team motivation's mediating role can provide valuable insights for SAR team leaders and organisations in fostering a motivated and high-performing team.

Research framework and hypotheses

Figure 1 presents the research framework.

Based on the framework, the following hypotheses ensued:

H1: There is a positive relationship between team communication and SAR team performance.

H2: Team motivation mediates the relationship between team communication and SAR team performance.

Research methodology

Participants and procedures

This study adopts teams as its primary unit of analysis, with purposive sampling employed to specifically target SAR teams engaged in SAR missions. Ten states in Peninsular Malaysia were selected, each comprising several stations and zones. Both team members and leaders received self-administered questionnaires for data collection. The researchers utilised online tools to collect the data, monitoring responses for consistency after two weeks and at the end of the month. Additionally, the study established two prerequisites that respondents had to meet to be eligible for

completing the questionnaires. The prerequisites were the following: (1) the team leader had to work directly with team members, and (2) each participating SAR team had to have a minimum of three team members. The teams were homogeneous because they all had the same goal: to find and rescue missing persons. They were also all trained in the same SAR techniques, which gave them a common understanding of how to approach SAR missions. This homogeneity helped to ensure that the teams were able to work together effectively and efficiently. The sample size for this study was determined based on the recommendations of Hair et al. (2014) and Reinartz et al. (2009). The final sample for this study came from 19 selected SAR stations in Peninsular Malaysia. Initially, 20 stations were selected, but only 19 stations agreed to participate. One SAR station denied participation because of internal issues. A total of 209 teams consisting of a minimum of three members (one team leader) participated in the study. A total of 850 individual questionnaires were distributed to the 209 teams. Each set of questionnaires consisted of four individual questionnaires answered by one team leader and a minimum of three team members.

Research instruments

The data for this study were collected from SAR teams in Peninsular Malaysia. The sample consisted of team members and their leaders. A total of 940 individual team members received questionnaires during the data collection process, and the responses were aggregated to obtain the final team scores. To ensure consistency and facilitate respondents' understanding, six negatively worded items in the questionnaire were rephrased to have positive wording. Out of the 940 questionnaires distributed, 850 responses were received, representing 209 teams. All 850 returned questionnaires were deemed usable and complete for further analysis. The collected data were then analysed using structural equation modelling (SEM) with the partial least squares (PLS) technique, employing SmartPLS software (Hair et al., 2014). The measurement tools employed in the study were modified based on previous studies carried out in the same subject area. The scales were accepted based on their reliability value and were modified to fit this study.

Team communication

Team communication is assessed through a set of five items that gauge the level of agreement from (1) strongly disagree to (5) strongly agree, adapted from Liu et al. (2020). Items in the scale include members' responses towards team communication, types of communication used, the impact of team communication on job accomplishment, and the use of communication in getting information and tasks done.

Team motivation

Team motivation consisted of five items on a seven-point Likert scale ranging from (1) strongly disagree to (7) strongly agree. Items were adopted and adapted from Chandrasekar (2011). Items include members' internal drives to achieve specific team goals. Members were asked about their

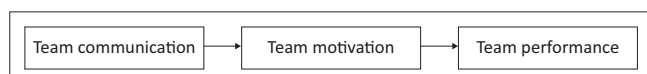


FIGURE 1: Research framework.

willingness to put extra effort and time into the team, their job satisfaction and their ability to manage challenges during team operations.

SAR team performance

A 14-item five-point Likert scale ranging from (1) strongly disagree to (5) strongly agree was utilised to measure SAR team performance. The scale used in this study was adapted and adopted from Morgeson et al. (2005). The assessment encompassed multiple dimensions of team performance, encompassing the efficiency of team members in fulfilling their responsibilities, the effective utilisation of tools and equipment for task completion and maintenance, proficient planning and organisation of work, as well as team members' interpersonal facilitation, interpersonal assistance, job dedication and individual initiative.

Ethical considerations

Approval for the distribution of the questionnaire was obtained from the Research Ethics Committee (reference number 600-TNCPI [5/1/6]). Subsequently, the questionnaire was approved by the FRDM (reference number JBPM/IP/RNP: 800-2/1/4 [17]) before being distributed to the FRDM SAR teams in the selected states.

Data analysis

Respondents' profile

Out of the 850 respondents, 85 individuals were identified as team leaders, while the remaining 765 were classified as team members. The group of team leaders comprised officer commanders and in-charge personnel from the Fire and Rescue stations. The profiles of these respondents were categorised into two groups: team leaders and team members. Detailed profiles of team leaders and team members can be found in Table 1 and Table 2, respectively.

Measurement model

The first step involved constructing the measurement model to assess its reliability and validity, while the subsequent step focused on constructing the structural model for a deeper analysis that provided evidence supporting the theoretical framework. The measurement model was constructed to examine the item reliability, internal consistency, convergent validity and discriminant validity of the items. Item reliability and internal consistency were evaluated to ensure the reliability of the measurement model. According to Sarstedt et al. (2017), high item reliability is reflected in a strong correlation between items and constructs. The internal consistency of each construct was assessed using composite reliability (CR), which represents the sum of indicators' loadings and the variance in error (Sarstedt et al. 2017). After establishing the reliability of the measurement model, the next step was to assess its validity, specifically convergent validity and discriminant validity. Convergent validity determines whether an item in a latent variable effectively measures

TABLE 1: Team leaders' profile.

Item	Category	Frequency
Age (years)	20–30	1
	31–40	29
	41–50	31
	51–60	24
Gender	Male	83
	Female	2
Races	Malay	81
	Indian	4
Marital status	Single	3
	Married	82
Academic qualification	SPM	56
	STPM	5
	Foundation or matriculation	1
	Diploma	15
	Bachelor degree	7
	Others	1
Position or Grade	KB41–KB54	4
	KB29–KB40	16
	KB22–KB26	61
	KB19 or PBB	4
Length of service (years)	Below than 1	1
	1–10	11
	11–20	29
	21–30	32
	31 and above	12

SPM, Sijil Pelajaran Malaysia; STPM, Sijil Tinggi Persekolahan Malaysia.

TABLE 2: Team members' profile.

Item	Category	Frequency
Age (years)	20–30	255
	31–40	241
	41–50	201
	51–60	68
Gender	Male	743
	Female	22
Races	Malay	748
	Indian	1
	Other	16
Marital status	Single	147
	Married	618
Academic qualification	SPM	592
	STPM	57
	Foundation or matriculation	3
	Diploma	98
	Bachelor degree	1
	Others	14
Position or Grade	KB41–KB54	1
	KB29–KB40	15
	KB22–KB26	176
	KB19 or PBB	573
Length of service (years)	Below than 1	34
	1–10	295
	11–20	243
	21–30	183
	31 and above	10

SPM, Sijil Pelajaran Malaysia; STPM, Sijil Tinggi Persekolahan Malaysia.

the intended construct (Ramayah et al., 2018). On the other hand, discriminant validity examines the degree of differentiation or distinction between items within a latent variable (Ramayah et al., 2018).

The outer loading values, CR and average variance extracted (AVE) for the reflective constructs in the study were all found to be satisfactory. The outer loading values showed that the correlation between each indicator and its respective construct was strong, with all values being greater than 0.708. The CRs for all of the constructs were also greater than 0.70, indicating that they were reliable. The AVEs for all of the constructs were also greater than 0.5, indicating that they were valid. After assessing convergent validity, the measurement model was further analysed to evaluate its discriminant validity. Discriminant validity refers to the extent to which indicators differentiate between different constructs or assess distinct concepts (Hair et al., 2017). Discriminant validity was assessed using the heterotrait–monotrait ratio of correlations (HTMT). The HTMT values for all pairs of constructs were below the recommended thresholds of 0.85 and 0.90, which indicates that the constructs are distinct from each other. Beta and *t*-values are computed via bootstrapping procedure with 209 cases and 850 samples (**, $p < 0.01$ [2.33], *, $p < 0.05$ [1.645]). The effect sizes of team communication, team motivation and team performance were moderate to large. The direct effect of team communication on team motivation was 0.68, with an effect size of 0.35. This indicates that team communication has a significant impact on team motivation. The communalities, AVEs and discriminant validity data in Table 3 suggest that the measurement model has a good fit to the data. The communalities for all of the indicators are high, ranging from 0.638 to 0.925. This indicates that the indicators are good measures of their latent variables. The AVEs for all of the latent variables are also high, ranging from 0.513 to 0.815. This indicates that the latent variables are well defined and reliable. The discriminant validity of the study was also good. The square root of the AVE for each latent variable was greater than the correlation between that latent variable and any other latent variable. This indicates that the latent variables are measuring different constructs. Specifically, the communality for the team communication construct is 0.513, which indicates that 51.3% of the variance in the construct is explained by its indicators. The AVE for the team communication construct is 0.815, which indicates that 81.5% of the variance in the construct is explained by its indicators. The correlation between team communication and team motivation is 0.773, which is less than the square root of the AVE for team communication ($\sqrt{0.815} = 0.903$). Overall, the communalities, AVEs and discriminant validity data in Table 3 suggest that the measurement model has a good fit for the data. Figure 2 illustrates the path coefficients of the tested variables. Table 4 reflects the path coefficient for the studied variables.

Aggregation of data

In order to proceed with the evaluation of the structural model and assess the reliability and validity of the measurement model, the individual-level data needed to be aggregated to the team-level. This is following what Jayasingam et al. suggested (2013). Strong levels of agreement were found for all 209 teams in the data with values ranging from 0.9393 to 1.0883. As suggested by James

TABLE 3: Outer loading values, composite reliability and average variance extracted.

Construct	Scale	Item	Loading	CR	AVE
Team communication	Reflective	Com_1	0.638	0.862	0.513
		Com_2	0.740		
		Com_3	0.637		
		Com_4	0.814		
		Com_5	0.833		
		Com_6	0.603		
Team motivation	Reflective	Mot_1	0.879	0.972	0.815
		Mot_2	0.892		
		Mot_3	0.906		
		Mot_4	0.925		
		Mot_5	0.924		
		Mot_6	0.868		
		Mot_7	0.920		
		Mot_8	0.905		
SAR team performance	Reflective	Perf_1	0.873	0.973	0.718
		Perf_2	0.878		
		Perf_3	0.882		
		Perf_4	0.875		
		Perf_5	0.779		
		Perf_6	0.852		
		Perf_7	0.848		
		Perf_8	0.829		
		Perf_9	0.875		
		Perf_10	0.723		
		Perf_11	0.884		
		Perf_12	0.863		
		Perf_13	0.820		
		Perf_14	0.865		

AVE, average variance extracted; CR, composite reliability; SAR, search and rescue.

TABLE 4: Path coefficient for the internal and external team factors and search and rescue team performance.

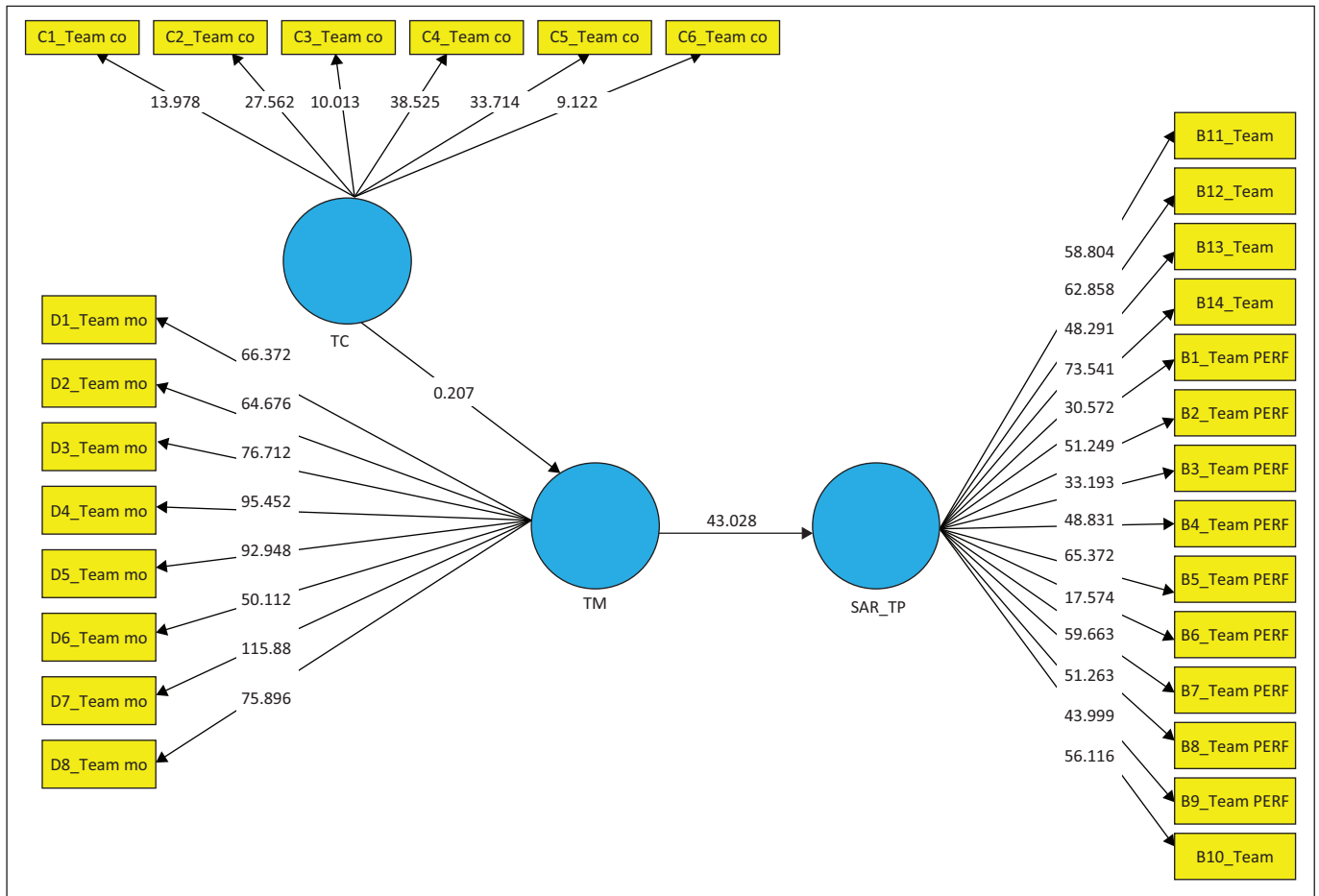
Relationship	Beta	SE	t	p	Decision
Team communication -> SAR team performance	0.206**	0.059	3.511	0.000	Supported

SAR, search and rescue; SE, standard error.

** $p < 0.01$ (2.33).

et al. (1984), the $r_{WG(j)}$ value of each data set must be above the value of 0.70.

Upon completion of the measurement model validation, the subsequent step involved the computation of the structural model whereby path coefficients were calculated to indicate the significance of each pathway. To evaluate the model's efficacy in predicting outcome, the R2 value gauged the predictive power of the exogenous latent variable, while predictive relevance (Q2) was employed to assess the model's predictive capability. Furthermore, the overall predictive ability of the model was assessed using the goodness of fit (GoF) index. Significance testing was conducted to ascertain the direct effects of team communication, team motivation, and team performance. The findings revealed that team communication ($\beta = 0.206, p < 0.01$) and team motivation ($\beta = 0.203, p < 0.01$) exhibited significant associations with team performance. However, the mediation hypothesis regarding the influence of team motivation in the relationship between team communication and team performance was substantiated. The study recorded a GoF value of 0.705, indicating a favorable overall fit of the model to the data.



SAR_TP, search and rescue_Team performance; TC, team communication; TM, team motivation.

FIGURE 2: Path coefficients analysis.

Mediation analysis

A mediating variable is a subsequent variable in a causal relationship between independent variables and dependent variables. Mediation effects will happen from an external effect on an internal relationship. The findings of the indirect mediation analysis indicated that team motivation does not mediate the relationship between team communication and SAR team performance. The path coefficient for the indirect effect was not significant, indicating that team motivation did not mediate the relationship between team communication and SAR team performance. In other words, the relationship between team communication and SAR team performance was not explained by team motivation. There are a number of possible interpretations for these results. One possibility is that team motivation is not a strong enough mediator to explain the relationship between team communication and SAR team performance. Another possibility is that there are other factors that are mediating the relationship between team communication and SAR team performance. Detailed results can be found in Table 5.

Discussion

In contrast to earlier research by Rajhans (2012) and Harris and Nelson (2008), who emphasised the importance

of communication in teams by highlighting its role in information sharing and mission execution, our study reveals different findings. Our results indicate a positive correlation between team communication and SAR team performance. However, the relationship between team communication and SAR team performance does not appear to be mediated by team motivation. This raises the question of whether motivation is another antecedent of performance rather than a mediator for SAR teams. To address this, future research should delve deeper into the theoretical framework to identify the underlying factors affecting team performance in SAR missions. The unique nature of SAR missions, characterised by their hazardous and risky environments, may contribute to the distinct findings in our study. In these high-stakes situations, effective communication becomes vital for the survival of SAR teams. Motivated by the necessity to work cohesively to reach victims, SAR teams rely heavily on clear and constant information flow within the team (Sharifah et al. 2012). Consequently, the impact of motivation on performance might be overshadowed by the critical role of communication in ensuring the safety and success of SAR missions. The present study highlights the significance of effective communication in fostering strong bonds between team members and team leaders, ultimately leading to improved team performance. It is crucial for the mission mastermind to address any communication issues that may

TABLE 5: Path coefficient for the mediation path.

Relationship	Std. beta	Std. error	<i>t</i>	Confidence interval (BC)		<i>p</i>	Decision
				LL	UL		
Team communication -> team motivation -> SAR team performance	-0.007	0.033	0.207	-0.070	0.056	0.836	Not supported

BC, bias corrected; LL, lower level; SAR, search and rescue; UL, upper level.

hinder effective team interaction. Teams that successfully resolve communication problems are likely to be more efficient and effective in achieving their goals. Our findings demonstrate that Malaysian rescue teams exhibit enhanced teamwork through both verbal and non-verbal communication. The constant use of verbal communication and the utilisation of non-verbal cues such as signs and symbols play key roles in the success of SAR missions (Guoqiang et al., 2017). As a result, it can be concluded that team communication plays a vital role in enhancing team performance, particularly in high-risk and time-sensitive missions like SAR operations.

The findings of this study have important practical implications for SAR operations. Effective communication is vital for enhancing team performance and ensuring successful rescue missions. To optimise communication's impact on team performance, leaders should consider implementing various strategies. These include providing comprehensive training in communication skills, establishing clear communication protocols, encouraging open communication, utilising appropriate technology, exhibiting strong leadership support, and continuously evaluating and improving communication processes. By adopting these measures, SAR teams can enhance coordination, decision-making and overall effectiveness, ultimately leading to more successful outcomes in high-stakes rescue missions. In summary, our study contributes to the understanding of the relationship between team communication and performance in the context of SAR missions. However, further research is needed to explore the complexities of this relationship, including the potential role of motivation as an antecedent of performance. By developing a comprehensive theoretical framework, future studies can ask more targeted questions and provide deeper insights into the factors influencing team performance in challenging environments like SAR operations.

Recommendations for future studies

While this study provides valuable insights into the relationship between team communication and SAR team performance, there are opportunities for future research to expand on these findings and address potential limitations. Future studies could focus on investigating the specific communication strategies and practices that contribute to improved team performance in SAR operations. Exploring the role of technology in facilitating communication and coordination during rescue missions could also be valuable. Additionally, researchers might delve into the interplay between team communication and other team-related factors, such as leadership styles, decision-making processes and individual competencies, to identify comprehensive

predictors of SAR team performance. Given the dynamic and high-risk nature of SAR missions, future research could also examine the impact of stress and time pressure on communication effectiveness and team performance. This could lead to the development of targeted interventions and training programmes to enhance communication skills in challenging and time-sensitive environments. Furthermore, it would be insightful to conduct cross-cultural studies to explore how communication dynamics may vary across different SAR teams and cultures, providing a more comprehensive understanding of effective communication strategies in diverse contexts. Future research in this domain should aim to identify evidence-based practices and strategies that can optimise communication and teamwork in SAR missions, ultimately contributing to improved outcomes and increased safety for both SAR team members and the individuals they rescue.

Conclusion

This study investigated the relationship between team communication, team motivation and SAR team performance. The study also examined the mediating role of team motivation in relation to team communication and SAR team performance. The sample in this study came from SAR teams based at 19 selected Fire and Rescue stations in Peninsular Malaysia, which comprised one team leader and a minimum of three team members. The findings of this study stipulated that team communication has a direct relationship with SAR team performance. The findings also outlined that team motivation does not mediate the relationship between team communication and SAR team performance. This study adds to the existing literature by identifying the impact of team communication on team performance. The results should also help FRDM and other rescue teams understand how internal and external team factors affect team performance and acknowledge the mediating role of team motivation. The study's findings have several implications for team leaders and managers. Firstly, team leaders and managers should focus on creating a motivating environment for their teams. This can be done by providing clear goals and expectations, offering regular feedback and recognising team members' contributions. Secondly, team leaders and managers should encourage effective team communication. This can be done by providing opportunities for team members to share information and ideas and by creating a culture of open and honest communication. Thirdly, team leaders and managers should be aware of the factors that can influence team motivation. These factors include team leadership, team time management and the workplace environment. By understanding these factors, team leaders and managers can create a more motivating environment for their teams.

Overall, the findings of this study suggest that team communication is a key factor in team performance. By focusing on team communication, team leaders and managers can create teams that are more effective and productive.

Acknowledgements

The authors would like to acknowledge the Ministry of Higher Education Malaysia and the Fire and Rescue Department of Malaysia for their assistance during data collection and for their permission to publish the research findings.

Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

Authors' contributions

A.A.Z. was the main and corresponding author; N.A.H., N.Z.K. and A.A.Z. were the co-authors; and F.W.H. was the co-author and collaborator.

Funding information

The research is supported by the Fundamental Research Grant Scheme (FRGS/1/2018/SS03/UITM/02/16) provided by the Ministry of Higher Education Malaysia. The terms of this arrangement have been reviewed and approved by the University Technology MARA in accordance with its policy on objectivity in research.

Data availability

The data that support the findings of this study are available on request from the corresponding author, A.A.Z.

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