



Impact of Shared Cognition on Team Effectiveness with Mediating Role of Intra-Team Communication: A Study on Organizational Teams

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Abstract: Many corporate organizations in Pakistan have now started to create teams who work to achieve a single goal to improve the effectiveness and overall productivity of the organization. Many factors can impact the effectiveness of these teams. This research paper analyzes the impact of shared cognition on team effectiveness with the mediating role of intra-team communication on organizational teams in Pakistan. This paper will help the managers understand how they can improve their team's efficiency and make their teams more effective. The approach used in this research paper is quantitative. The information for this research is gathered through the interrogation technique, where surveys were collected from organizational team members. The sample size for this research is 208 organizational team members, and non-probability sampling has been used. The data is collected through convenience sampling, and its analysis is done through Microsoft Excel and SPSS. Correlation and regression were conducted to determine the relationship between variables, and regression through the Hayes model observed the mediation effect. Significant values have helped to determine if the hypothesis mentioned in the report can be accepted or not. The research concludes that the causal relationship of shared cognition leading to intra-team communication does significantly impact team effectiveness. Managers can integrate these concepts into their organizational teams to make them more effective. These results indicate that for managers to improve team effectiveness in their organizational teams, they need to focus on the shared cognition of team members. Team effectiveness and the organization's overall performance can improve if members have a shared cognition

Keywords: *Shared cognition, intra-team communication, team effectiveness, organizational teams*

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INTRODUCTION

In Pakistan corporate sector is striving to grow, therefore applying and adopting different techniques, work models, technology and bringing massive changes in the organizational structure and culture. For this reason, nowadays, a huge focus is on project management and raising team effectiveness to contribute to the development of the country's industry. In the past, studies highlighted the role of organizational teams in effectively completing the project or

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the task and escalating organizational performance. And work is done to figure out how managers can increase the effectiveness of their teams or teamwork. Amin, Kamal, and Sohail (2016) conducted a study to understand the impact of transformational leadership on a team's performance. Danish, Aslam, Shahid, Bashir, and Tariq (2015) studied cohesiveness, openness to change, motivation, and role clarity as important factors affecting team performance in their study on the banking sector of Pakistan. However, various important factors are yet to explain and explore.

Studies suggested that shared cognition has a significant impact on team effectiveness. Shared cognition is an activity of collective thinking of team members who have a common goal in front of them. There are different team members in a team and possessing different attributes which influence team effectiveness (Chen, Chang, & Chang, 2017; Greer, de Jong, Schouten, & Dannals, 2018). Through shared cognition, team members develop a collective belief regarding the objectives and goals to be achieved and work together to achieve that goal. Team members communicate with each other to share their ideas and thoughts, which will increase the effectiveness of a team (Ross, Jones, & Adams, 2008). Lack of good intra-team communication can cause confusion, distrust, and conflicts among team members, affecting team effectiveness and team performance badly (de Jong, Schalk, & Curşeu, 2008; Purvanova & Kenda, 2021).

Previously, the impact of shared cognition on team effectiveness was studied on entrepreneurial teams. At the same time, it was proposed that the impact be substantially different on other organizational work teams because of the diversity of tasks. Therefore, studies needed to be conducted to explore and explain the process and the impact shared cognition can have on team effectiveness in a different setting (Chen et al., 2017). Moreover, in their research, DeChurch and Mesmer-Magnus (2010) stated that while demonstrating the impact of team cognition and team effectiveness, an extension on their model should be made studying how internal- team dynamics can influence shared cognition. Furthermore, it was debated that for a group to be cohesive and have shared cognitive abilities; they have to interact so that intra-team communication could be one of those internal dynamics (Daspit, Tillman, Boyd, & Mckee, 2013).

This research aims to empirically test the relationship of shared cognition on team effectiveness with the mediating role of intra-team communication. Our study attempts to provide a mechanism to managers and organizations to increase their team effectiveness by promoting shared cognition and intra-team communication among the members or employees. This paper will proceed with a summarized review of the literature to support the linkage among the selected variables, statistical analysis will quantify the results of the data gathered to measure the relationship, there will be a brief discussion on the validity, and the application of results drawn and the paper will cap up with its limitations. It will provide some hunches for future studies.

LITERATURE REVIEW

Shared Cognition

Shared cognition refers to the extent to which group members can understand and comprehend each other's perspectives and social signals. It serves as the group's unique asset involving shared interpretation and representation of common goals (Nahapiet & Ghoshal, 1998). Kirschenhofer and Lechner (2012) and Cropanzano and Mitchell (2005) described that team's shared cognitive abilities could be identified by using common language, shared goals, and mutual understanding, which is considered important for communication and assimilation of resources.

Deep diving into the construct of shared cognition while studying teams and teamwork, it is deduced that shared cognition can serve as an explanatory mechanism in analyzing team performance and effectiveness. Cannon-Bowers and Salas (2001) discussed that during the last ten years, most of the studies have observed that high-performing teams tend to coordinate their actions effectively, often without the need to communicate formally. Besides, in their research, Mohammed and Dumville (2001) shared that the team members sharing the same knowledge interpret cues similarly; this all is because of the existence of shared cognition. It reflects the importance of shared cognition in escalating the communication process to the level where the team members can perceive accurate explanations and expectations for the assigned task. Therefore, organizations must look for ways to promote shared cognition in teams.

Moreover, in his study, Matteson (2010) expounded on the impact of group interactions in facilitating shared cognition. Small group communication was focused in the study, where it was explained that communication in a small group occurred when a group of individuals came together to discuss their cognitive schemas. Then those ideas kept on reconstructing and forming new schemas that develop and facilitate team cognition or shared cognition. The study followed a very realistic approach where dimensions such as communication type, channels, roles, and their impact on the team's mental models were studied. Researchers argued that if employees are motivated to interact with each other

and share knowledge and information, it helps stimulate shared cognition among the employees.

Intra-Team Communication

Guzzo and Shea (1992) defined intra-team communication as a social interaction that illustrates how team members communicate, exchange their ideas, and resolve conflicts. Getting on-time information to achieve the goal is very necessary, and this information will only be available if group members effectively communicate with each other. Team performance is highly dependent on intra-team communication as it helps in problem-solving and ensures timely availability of information (Leenders, Van Engelen, & Kratzer, 2003; Lubowiecki-Vikuk, 2020).

Stout, Cannon-Bowers, Salas, and Milanovich (1999) stated that communication is a source of trust and support, which helps effective interaction between team members. Parlamis and Dibble (2019) applied Media Synchronicity Theory (MST) as the foundation to find whether teams perform better using multiple communication modes or not. As it's the age of the internet and connecting with people all around the globe is no more a hassle, companies are experiencing a shift in team structures and mediums of communication. It is no longer required to have face-to-face communication, and sometimes it's not the most preferred medium either.

Team Effectiveness

There is an increasing consensus that teamwork and team effectiveness play a tremendous role in effectively completing the assigned tasks or the project. Gorman, Grimm, and Dunbar (2018) described the team as evolving entities that alter their attitude and structure to meet environmental demands and changes. Various situations and phases unfold that these teams are known to adapt, coordinate, and work in a dynamic organizational environment to accomplish the assigned task.

The ability to adapt and successfully emerge from these situations to achieve set goals shows how effective a team is. McGrath (1984) defined team effectiveness as a combination of task performance and team viability. Team viability has been further explored by Hackman (1978) where he expanded it into two constructs; maintaining group or team members' ability to work together in the future and the members' satisfaction. So we can understand team effectiveness as a blend of task performance, satisfaction with group dynamics, and team output, also taken as the willingness of team members to work together again by Bushe and Coetzer (2007).

Relationship between Shared Cognition and Team Effectiveness

As team cognition is considered an important factor in ensuring effective team execution, it can also be expected of the cognition process to ensure efficient or desired results, hence creating an affirmative influence on team performance (DeChurch & Mesmer-Magnus, 2010). Here, the collation of cognitive processes of the team is considered an independent variable on which the team performance depends upon. So there is the first hypothesis of the study:

H1: *Team cognition has a significant impact on team effectiveness.*

Relationship between Shared Cognition and Intra-team Communication

As shared cognition evolves in a group, members must interact continuously to define and redefine their ideas (Forgas, 1981). Matteson (2010) suggested in her study that group outcomes are redefined from time to time due to social cognition and intra-team communication. Shared cognitive processes strengthen intra-team communication and are thus considered important for a team to communicate effectively (Park, 2008). This leads towards the second hypothesis of the study:

H2: *Shared cognition has a significant impact on intra-team communication.*

Relationship Between Intra-team Communication and Team Effectiveness

The more team members communicate with each other, the more they can solve their problems better and achieve their goals timely. Henttonen, Johanson, and Janhonen (2014) mentioned that developing a social network between a team gives them a feeling of familiarity and hence develops trust between members and effectiveness in group outcomes. Interdependence theory also supports this hypothesis, as teams are said to have positive interdependence when members are seen to effectively communicate with each other, help other members, and are continuously involved in providing the required support. This positive interdependence results in higher team effectiveness (DeOrtentiis, Summers, Ammeter, Douglas, & Ferris, 2013). So the third hypothesis of the study is:

H3: *Intra-team communication has a significant impact on team effectiveness.*

Intra-team Communication as a Mediator Between Shared Cognition and Team Effectiveness

Teams with shared cognition and strategies for communication to avoid conflicts can perform their task in a better way than those who lack shared cognition (Park, 2008). The more team members think collectively, the better their decision-making is required for a team to succeed and become effective. This collective thinking is termed a social or shared cognition and is often vital for avoiding conflict between members (Chen et al., 2017). Mathieu, Heffner, Goodwin, Salas, and Cannon-Bowers (2000) also described how shared cognition improves intra-team communication and develops a strong understanding between members, reducing the chance of having conflicts and increasing team effectiveness. Based on this information

H4: *Intra-team communication mediates the relationship between shared cognition and team effectiveness.*

Conceptual Framework

This research aims to study the impact of shared cognition on team effectiveness with the mediating role of intra-team communication. The conceptual framework for this research is as shown:

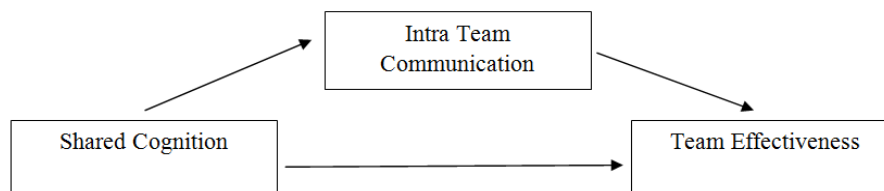


Figure 1 *Research Framework*

METHODOLOGY

This is an empirical study aimed to test the relationships among the variables. A quantitative research strategy is adopted to ensure the authenticity and reliability of results. The causal study approach is used to determine variables' relationships and their impact on each other.

Data and Sample

The research population was the team members working in different organizations in Lahore, Pakistan. The sample size for this research is 208 organizational team members. Employees from different organizational teams are surveyed in this study; this reduced the percept bias that affects the results when data is collected from a single source. The Multivariate analysis technique is used (Hair, Black, Babin, Anderson, & Tatham, 2009). Out of 220 survey questionnaires, 208 were properly filled by the employees of the selected organizations representing a response rate of 71.6%.

Non-probability sampling followed by convenience sampling is used for this research. The reason for choosing this non-probability sampling technique was based on ease of reaching respondents, time constraints, and accessibility to the respondents. Respondents for the survey were selected based on accessibility and relevance. A cross-sectional field survey method was used, and data were collected through a self-administered questionnaire and google forms.

Research Measures

A questionnaire survey was constructed tested, and scales were adapted from the literature to collect the relevant data from the population. Shared cognition Strategic human resource management is measured by using 3 items tool developed by Tsai and Ghoshal (1998). Moreover is measured by using 3 items tool of Campion, Medsker, and Higgs (1993). Whereas tool based on 21 items is adapted from the study of Gibson, Zellmer-Bruhn, and Schwab (2003) for measuring team effectiveness.

Research Method and Tools

A questionnaire was developed, which was divided into four sections. The first section was based on basic demographic information, and the rest three sections entailed survey questions for the four involved variables. All

survey questions are closed-ended, and the Likert scale has been used for all these sections. Scoring for the Likert scale ranges from 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Data were analyzed through SPSS software.

ANALYSIS

Reliability Analysis

To check the reliability of the data, Cronbach's alpha is used, which is used to measure the internal dependability of each of the constructs that are used in the research. The minimum limit accepted for the reliability of "alpha" is 0.60 (Hair et al., 2009). The Cronbach's alpha values against all the three variable in Table 1 shows that all measure of our study is reliable.

Table 1 *RELIABILITY ANALYSIS*

Variable	Cronbach's Alpha
Shared Cognition	0.746
Intra-team Communication	0.793
Team Effectiveness	0.764

Descriptive Statistics and Correlation

A correlation analysis was conducted to determine the strength of the relationship among the variables. Variables with a correlation below 0.3 are said to be weakly correlated, correlation between 0.3 and 0.5 considered moderately correlated, and correlation above 0.5 is said to be strongly correlated. Table 3 presents that shared cognition is moderately correlated with team effectiveness as the Pearson correlation value is 0.354 and between 0.3 and 0.5; hence, their correlation is moderate. Similarly, the Pearson correlation value between shared cognition and intra-team communication is 0.358, which explains that they are moderately correlated as the Pearson correlation values are between 0.3 and 0.5. Furthermore, the correlation between team effectiveness and communication is 0.530. This value is above 0.5, so their relationship is strongly correlated.

Table 2 *DESCRIPTIVE STATISTICS*

	Mean	Std. Deviation	Analysis N
Shared Cognition	4.0625	0.56165	208
Communication	4.1394	0.55633	208
Team Effectiveness	3.8146	0.38620	208

Table 3 CORRELATION MATRIX

		Team Effectiveness	Shared Cognition	Communication
Team Effectiveness	Pearson Correlation	1		
	Sig.	-		
	N	208		
Shared Cognition	Pearson Correlation	0.354	1	
	Sig.	0.000		
	N	208	208	
Communication	Pearson Correlation	0.530	0.358	1
	Sig.	0.000	0.000	-
	N	208	208	208

Regression Analysis for Analyzing Relationships

Regression analysis was used to measure the goodness of fit for the model and the impact of shared cognition and intra-team communication on team effectiveness. In model summary, the "Adjusted R Square" showed the deviation from the total mean of a dependent variable (Team Effectiveness) explained by the independent variable was 30.5%. The rest, 69.5% of team effectiveness, can be of various other variables not included in this research. The std. error of the estimate represents the variation in the model, which could cause changes in the results up to -0.32196 to +0.32196.

Through ANOVA testing, it was observed that the significance value is $p = 0.000$ in the ANOVA model is less than 0.05, which shows that the model is significant. Hence, it can be said that there is 95% confidence in the result, and the chances of error are only 5%. It can also be said that the total change of reliability in the data was 30.875, in which regression was only for 9.625.

Table 4 REGRESSION ANALYSIS

Model	Coefficients			t	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
Shared Cognition x TE	0.130	0.043	0.188	3.036	0.003
Communication x TE	0.321	0.043	0.462	7.449	0.000
Shared Cognition x C	0.355	0.064	0.358	5.512	0.000

The coefficient Table 4 shows that the dependent variable, team effectiveness relates 18.8% with Shared cognition, which means that if 1 point in shared cognition is increased, team effectiveness will increase by 18.8%. Similarly, according to this data, if 1 point of intra-team communication increases, team effectiveness will increase by 46.2%. The sig. value of both shared cognition (0.003) and intra-team communication (0.000) is less than 0.05; our hypotheses (1 and 2) are accepted. The sig. value of shared cognition and intra-team communication (0.000) shows that our hypothesis 3 is accepted. Similarly, according to this data, if 1 point of shared cognition increases, intra-team communication will increase by 35.8%.

Mediation Effect

Haye's model 4 was adopted for regression analysis for the mediator. All the p values observed were 0.0000; hence they are significant. In the indirect effect of shared cognition & team effectiveness table, the values of both BootLLCI and BootULCI were above 0, when both the values are subtracted (0.1709-0.0644), 0.1065 is observed, which is greater than 0. This shows that mediation does exist. Hence, for every point of increase in intra-team communication, the relation between shared cognition and team effectiveness will increase by 11.4%. This information supports H4; hence it is accepted.

DISCUSSION

H1: Shared Cognition has a positive impact on team effectiveness. (Accepted)

The correlation analysis showed that shared cognition and team effectiveness are moderately correlated. The regression analysis concluded that shared cognition does have a significant impact on team effectiveness as sig. value is $0.003 < 0.05$. This means that hypothesis is accepted. The beta value showed that team effectiveness relates 18.8% with Shared cognition, which means that if 1 point in shared cognition is increased, team effectiveness will increase by 18.8%. Shared cognition denotes the team members' collective mental representation organized understanding of the external environment, and shared expectations concerning future events (Nahapiet & Ghoshal, 1998). Shared cognition has a positive impact on team members' decisions collectively, team effectiveness, and the organization's overall performance (Chen et al., 2017). Similarly, these results are also aligned with the study by DeChurch and Mesmer-Magnus (2010), which stated that the compilation of cognitive processes of the team is considered an independent variable on which the team performance depends upon. The acceptance of this hypothesis shows that shared cognition can positively impact team effectiveness.

H2: Shared cognition has a positive impact on intra-team communication (Accepted)

Correlation analysis showed that shared cognition and intra-team communication are moderately correlated. Through regression analysis, it was found that shared cognition does impact intra-team communication. The sig. value of shared cognition intra-team communication (0.000) shows that our hypothesis is accepted. Similarly, according to this data and beta value, if 1 point of shared cognition increases, intra-team communication will increase by 46.2%. For intra-team communication, shared cognition is necessary as it helps team members to communicate effectively (Park, 2008). Shared cognition gives team members common goals, collective values, representations, interpretations, and systems of meaning (Nahapiet & Ghoshal, 1998). Additionally, Matteson (2010) suggested that group outcomes are re-defined time after time due to social cognition and intra-team communication playing a vital role in this process. The acceptance of H2 is aligned with the previous studies and states that shared cognition does have a positive impact on intra-team communication.

H3: Intra-team communication has a positive impact on team effectiveness (Accepted)

The correlation between team effectiveness and communication is 0.530. This value is above 0.5, so their relationship is strongly correlated. Through regression, it is deduced that this hypothesis is accepted as the sig. Value is 0.000. Similarly, according to this data and beta value, if 1 point of intra-team communication increases, team effectiveness will increase by 35.8%. When there is more intra-team communication, there is less room for conflicts, and team members work cohesively, making the team more efficient. Through intra-team communication, team members can share their ideas, increasing the team's creativity and ultimately enhancing team effectiveness (Fletcher & Major, 2006). Henttonen et al. (2014) stated that developing a social network between a team gives them a feeling of familiarity and hence develops trust between members and effectiveness in group outcomes. Interdependence theory also supports this hypothesis, as teams are said to have positive interdependence when members are seen to be effectively communicating with each other, which results in higher team effectiveness (DeOrtentiis et al., 2013). Acceptance of H3 states that intra-team communication positively impacts team effectiveness, which is cohesive with all the previous studies mentioned.

H4: Shared cognition has a positive impact on team effectiveness via intra-team communication (Accepted)

The mediating variable, intra-team communication, was observed through Haye's process. Model 4 was used in this research. These results showed an indirect effect of shared cognition and team effectiveness, which includes the mediation of intra-team communication, the values of both BootLLCI and BootULCI are above 0 when both the values are subtracted ($0.1709 - 0.0644$), 0.1065 is observed, which is greater than 0. This shows that mediation does exist. Hence, for every point of increase in intra-team communication, the relation between shared cognition and team effectiveness will increase by 11.4%. Shared cognition is often proved to be vital for avoiding conflict between members (Chen et al., 2017), so groups who have shared cognition regarding communication rules are more satisfied with their group processes and can perform a task better than will those in groups lacking shared cognition concerning communication rules, in result leading towards more efficiency. Stewart and Barrick (2000) also supported this theory by stating that interdependency in a group is formed when members share similar knowledge and thought processes, effective communication between members having positive interdependence could result in team effectiveness. Both types of research support H4, and by accepting this hypothesis, it can be concluded that shared cognition positively impacts team effectiveness through a mediating role of intra-team communication.

CONCLUSION

This research was conducted to help the organizations' managers make their teams more effective. This study can help managers understand how factors like shared cognition and intra-team communication can impact team effectiveness. This study answers the research question that was established initially by stating that shared cognition leading to intra-team communication does have a significant impact on team effectiveness. When there is appropriate communication among the team members, the team is more effective because there would be fewer conflicts between the team members, and they would all work together in harmony towards the goals that they have to achieve as a team. These results indicate that for managers to improve team effectiveness in their organizational teams, they need to focus on the shared cognition of team members. Team effectiveness and the organization's overall performance can improve if members have a shared cognition (Chen et al., 2017). When team members have a shared cognition, they have a mutual understanding of their work, duties, and roles (Park, 2008).

Research Limitations

Although this study contributes to the existing knowledge and potentially guides the managers to raise their team effectiveness, it still entails many limitations. Accessing the organizational team members was a difficult task as some organizations are reluctant to conduct any survey from the members, and not all organizations make teams to achieve goals. Due to this and time constraints, convenience. Moreover, time and resources constraints restricted us from gathering data from the team members working in different organizations in the Lahore city of Pakistan. And data was collected randomly through the random sampling technique, limiting the generalizability of the findings and results of this research to some extent.

Future Directions

Surely, there is much to contribute to the scope of this study in the future for researchers. It is to be noted that in the model summary, the "Adjusted R Square" showed the deviation from the total mean of team effectiveness (dependent variable) explained by shared cognition and intra-team communication (independent variables) is 30.5%, the rest 69.5% can be of various other variables which are not included in this research. This is why it is important to understand that there can be many other variables that can impact team effectiveness.

In the future, researchers can explore the influence of different moderating conditions on the relationship between shared cognition and team effectiveness. Moreover, scholars can increase the validity of the findings by integrating different control variables in this study, such as different cities, countries, specified business sectors, and other potential variables. In addition, longitudinal studies could be carried out in future research, which involves multiple measures to improve external validity over an extended time.

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