

Confirmatory Factor Analysis of Teamwork in Organizations Using the GRPI Model

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Abstract. The objective of this study was to analyze the confirmatory factors of organizational teamwork using the GRPI model (Beckhard R., 1972). The research tool was the GRPI questionnaire modified from Summana Simui (2010) and Nemanja Berber (2020). The questionnaire comprised 40 items in sets of 5-point rating scale with the reliability at 0.966, ranging from 0.877-0.887, which had the internal consistency at high level. The sampling group was 283 employees who worked in Korndej-Group Co., Ltd. in Surin province, and ThaiNamThip Co., Ltd. in Khonkaen province, Thailand, using simple random sampling. Research tool was validated for its reliability using Cronbach's alpha coefficients with SPSS program and LISREL program was used for its construct validity. The results showed that the confirmatory factors and the construct validity of the developed model were fitted with the empirical data (Chi-square=68.03, df=45, p=0.015, GFI=0.961, AGFI=0.953, RMR=0.004, RMSEA=0.043)

Keywords: Confirmatory factor analysis; Teamwork; Organization; GRPI model

1 Introduction

The study of organizational teamwork has grown exponentially from the past to the present. Since the organization has seen the importance of teamwork and has adopted a more team-based approach to respond to the challenges of competitive conditions and the adaptability to create the organizational resilience. This is especially true for private organizations with a large number of employees and business competitors where the team is divided into different departments in the organization. Therefore, when teamwork is properly implemented, tasks that require collaboration can be highly productive and this is considered an invaluable resource of the organization (Hackman, 2002). The important reason why organizations try to adopt teamwork is that teamwork can be more successful than working alone (Gerard, 1995). Teamwork allows for more thoughtful decision-making than by any one individual (Manz and Sims, 1993). Further, teamwork can help to expand more skills and experience in problem-solving (Kernaghan and Cooke, 1990; Mennecke and Bradley, 1998). Based on this point, many

models have been proposed and developed for the purpose of identifying factors affecting the effectiveness of teamwork. Those models try to present the variables influencing the effectiveness of teams in a concrete way, so organizations can use different methods to manage those variables.

To develop the work process of employees in the organization, Beckhard (1972) has proposed a theory of organizational development model called the GRPI Model (Model of Team Effectiveness) which has widely used in the development of teams in organizations. According to the GRPI Model, the goals of team development are to reduce the time. It takes to build a team and focuses on the initial steps that will increase the productivity of the team. This will ensure productivity, efficiency and quality while enhancing the way team members collaborate. The GRPI model describes the dimensions that characterize teams by arranging in the form of a performance priority with 4 key factors: goals, roles, processes, and interpersonal relationships. This is similar the study conducted by McEwan (2017) on the effectiveness of teamwork training on teamwork behaviors and team performance. McEwan found that the effectiveness of teamwork training depends on 3 factors: 1) objective/mission/goal setting; 2) teamwork behaviors during team performance include actions that are consistent with the communication, coordination, and cooperation of each member; and 3) critical situation monitoring and post-task assessments of the system variables and problem-solving efficiency of the team. Similarly, Berber (2020) studied the relationship between perceived teamwork effectiveness and team performance in banking sector of Serbia. The study found that there are 9 variables related to the perceived teamwork effectiveness influencing team performance in banking sector of Serbia: 1) the common goal they strive for; 2) possession of skills, knowledge in the field they study and work on; 3) development of communication channels through which information is transmitted; 4) trust between team members; 5) motivation that leads to success; 6) Joint efforts of team members to solve the task; 7) active listening and respecting the ideas of other team members; 8) flexibility and adaptation to environmental influences; and 9) existence of a leader in the team who will lead the whole team and achieve success.

From the above-mentioned studies, it can be seen that the factors influence to confirm the successful of teamwork in the private sector are still unclear. Moreover, the study contexts are also different and most of the study are related to the banks and the large corporations, but the study related to private organizations that represents the distribution of products in specific zones and having warehouses, offices, and transportation departments in economic areas has less number of studies. Therefore, applying the GRPI Model is implemented, might affect to teamwork in organization. This study was interested to conduct a study on a confirmatory factor analysis of organizational teamwork using the GRPI Model to provide guidelines for improving the organizational teamwork quality in the private organization.

2 Research Objective

To conduct a confirmatory factor analysis of organizational teamwork using the GRPI Model.

3 Research Method

Quantitative research design was used in this study. A confirmatory factor analysis of organizational teamwork using the GRPI Model was conducted according to the following steps:

3.1 Population and Sample

Population: The total population was 620 employees including 440 employees of Korndej-Group Co., Ltd. in Surin province, Thailand, and 180 employees of ThaiNamThip Co., Ltd. in Khonkaen, Thailand. The two companies are private organizations that represents the distribution of products in specific zones. They have warehouses, offices, and transportation departments in economic areas. Their products are sold at wholesale prices. The two companies have clear organizational goals, divisions of work, and decisive decision makers. There is a communication between all parties in work and has a collaborative process for all parties.

Sample: The samples consisted of 283 employees (223 males and 60 females) who work for Korndej-Group Co., Ltd. (183 employees) and ThaiNamThip Co., Ltd. (100 employees). The samples were used for a construct validity testing. The sample size was determined based on the concept of Hair et al. (2010) and the 20 samples per parameter was determined according to this present study. Owing to the study, the variable was the organizational teamwork model with four indicators. There was a total of 10 parameters to be estimated. Therefore, a suitable number of samples should be at least 20 x 10 samples or 200 samples. In order to handle missing data, the researcher increased the number of samples to 300 by using a simple random sampling method and selected only 283 respondents who answered all the questions in a questionnaire.

3.2 Research Tool

A questionnaire was constructed by conducting empirical research to review related literatures and research. The constructed questionnaire was modified from Summana Simui (2010) and Nemanja Berber (2020). It divided into 2 parts as follows: *Part 1 basic information of respondents* and *Part 2 an assessment of the organizational teamwork using the GRPI Model*. Part 1 was a check-list questionnaire asking about basic information of respondents. Part 2 was a 5-point rating scale questionnaire asking about 4 factors including: 1) goals, 2) roles, 3) processes, and 4) interpersonal relationships. The total number of question items in Part 2 was 40 question items (10 question items per each factor) (Kanlaly Vanichbuncha, 1999). The drafted questionnaire was validated by 5 qualified-experts.

The validation of content validity made by 5 qualified-experts showed that the IOC value is between 0.80-1.00. There are 34 items considering the IOC value of 1.00 and the IOC value of 0.80 for 6 items. Totally 40 question items had reached the required criteria.

The reliability of 40 question items in this questionnaire had high level with the Cronbach's alpha coefficient in the overall reliability at .966. Considering the reliability in each factor from GRPI model show that totally of indicators was between .877-.887. The most reliable indicators were the organizational goals (0.887) and the roles (0.887) followed by the teamwork process (0.879) and the interpersonal relationships (0.877), respectively.

According to Pearson's product moment correlation coefficient analysis, it was found that the indicator of goodness had the correlation coefficient ranged from 0.813 to 0.855 at 0.01 significant level for all pairs. The result of Bartlett's test of sphericity was equal to 1189.180 ($p < .01$) indicating that variables are interrelated and can be used for factor analysis. The KMO was equal to 0.869 showing that variables were very well suited for factor analysis as shown in table 1.

Table 1. Mean, standard deviation, and Pearson's correlation matrix.

Indicator	Goal	Roles	Proce	Relat
Goals	1			
Roles	0.849**	1		
Proce	0.836**	0.838**	1	
Inrel	0.813**	0.841**	0.855**	1
Mean	2.589	2.590	2.566	2.560
S.D.	0.457	0.442	0.442	0.428
Bartlett's Test Of Sphericity=1189.180 Df=6 P=0.000 Kmo=0.869				

Note ** $p < .05$

3.3 Data Collection

The data collected by researcher and 3 research assistants who have been trained and understood the details of this study as same as the researcher. The face-to-face method of collecting data was used for 283 samples. Firstly, the researcher made a letter requesting permission for collecting data to the concerned organizations. After organizations had approved, the samples were signed the consent form for answering the questionnaire. Next, the research had explained the details of this study, objectives, and data collection process. In addition, the researcher also checked the understanding of samples about this study before collecting the data.

This study had been approved the research ethics from mahasarakham university as certified ethics review number 352-337/2564 on October 25, 2021.

3.4 Data Analysis

SPSS program was used for the validation of questionnaire's content validity and reliability. LISREL program was used to validate a construct validity of the model.

4 Finding

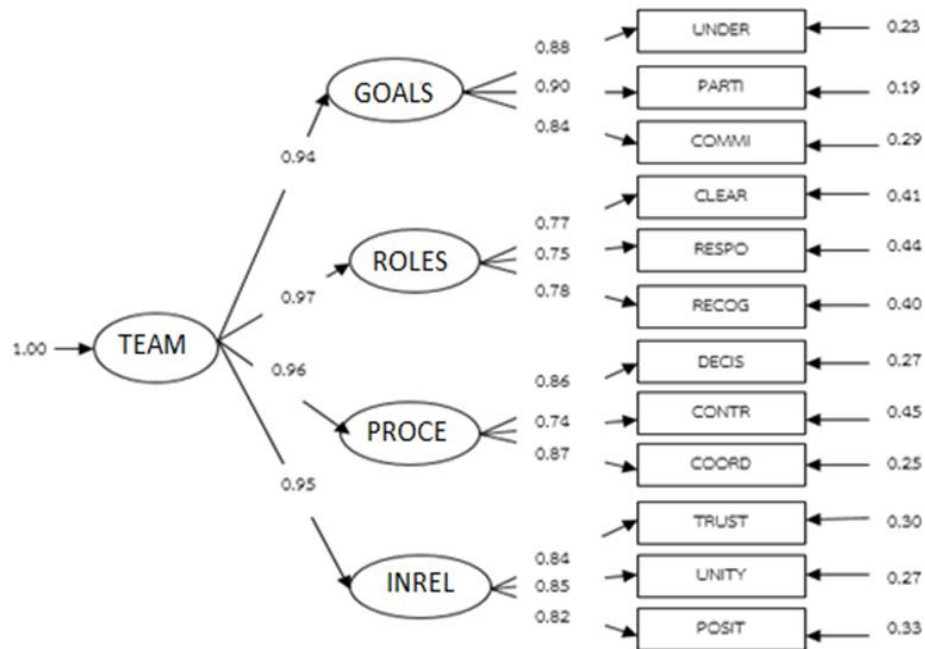
The results of the confirmatory factor analysis showed that the model was very fit with the empirical data ($\chi^2 = 68.03$, $df = 45$). The chi-square value was different insignificantly from 0 indicating the fitness of the developed model and the empirical data. GFI was 0.987 and AGFI was 0.933 which was greater than 0.90 or closer to 1. The RMSEA equaled to 0.008 which was lower than 0.05. The findings showed that that the model was fit with the empirical data as shown in table 2.

Table 2. The results of first and second order confirmatory factor analysis of the organizational teamwork using the GRPI Model.

Variable	Factor Loading		T	R ²	FS
	b(SE)	β			
The first order confirmatory factor analysis					
1) Goals (GOALS)					
Understanding of goals (UNDER)	0.880	0.840	-	0.774	0.461
Participation and acceptance of goals (PARTI)	0.901*(0.020)	0.877	21.782	0.808	0.578
Commitment to work for the goals (COMMI)	0.843*(0.022)	0.825	19.074	0.708	0.350
2) Roles (ROLES)					
Clarity of roles (CLEAR)	0.772	0.711	-	0.594	0.257
Participation and responsibility (RESPO)	0.754**(0.023)	0.704	15.902	0.556	0.291
Commitment and perception of authority (RECOG)	0.781**(0.017)	0.753	21.548	0.601	0.264
3) Processes (PROCE)					
Decision process (DECIS)	0.863	0.832	-	0.732	0.341
Collaborative control process (CONTR)	0.741**(0.028)	0.703	14.654	0.546	0.253
Coordination and communication (COORD)	0.874**(0.021)	0.835	19.159	0.753	0.535
4) Interpersonal relationships (INREL)					
Trust and respect (TRUST)	0.843	0.812	-	0.700	0.427
Unity and cooperation (UNITY)	0.851**(0.023)	0.823	17.656	0.725	0.383
Positive attitude and good working atmosphere (POSIT)	0.820**(0.026)	0.803	15.027	0.674	0.419
The second order confirmatory factor analysis					
Components of organizational goals (GOALS)	0.940**(0.055)	0.912	17.245	0.903	-
Components of roles (ROLES)	0.971**(0.064)	0.935	16.731	0.982	-
Components of teamwork processes (PROCE)	0.963**(0.037)	0.928	17.162	0.957	-
Components of interpersonal relationship (INREL)	0.954**(0.059)	0.904	16.395	0.938	-
Chi-square = 68.03, df = 45, p-value = 0.015, GFI = 0.961, AGFI = 0.953, RMR = 0.004, RMSEA = 0.043					

From table 2, when considering the standard factor loading of each indicator in the organizational teamwork using the GRPI Model, the standard factor loading of all indicators was positive in the range of 0.741 to 0.963 at .05 (p<.05) of statistically significant level. Roles in the organization (ROLES, 0.971) was the most important indicator followed by processes (PROCE, 0.963), interpersonal relationships (INREL, 0.954), and organizational goals (GOALS, 0.940), respectively. These findings indicated that all four indicators could be significant indicators of organizational teamwork using GRPI Model. The aggregate result of indicators of organizational teamwork using the GRPI theory is shown in Fig. 1. and can be written as an equation as follows:

$$\text{TEAM} = 0.461^{***}(\text{UNDER}) + 0.578^{***}(\text{PARTI}) + 0.350^{***}(\text{COMMI}) + 0.257^{***}(\text{CLEAR}) + 0.291^{***}(\text{RESPO}) + 0.264^{***}(\text{RECOG}) + 0.341^{***}(\text{DECIS}) + 0.253^{***}(\text{CONTR}) + 0.535^{***}(\text{COORD}) + 0.427^{***}(\text{TRUST}) + 0.383^{***}(\text{UNITY}) + 0.419^{***}(\text{POSIT})$$



Chi-Square=68.03, df=45, P-value=0.015, RASEA=0.043

Fig. 1. Organizational teamwork using GRPI model.

5 Conclusion and Discussion

The results of this study concluded that all four components were latent variables and correlated with the empirical data of the organizational teamwork using the GRPI Model. The roles within the organization (ROLES) were the most important factor, the second important factor was the teamwork processes (PROCE), the third important factor was the interpersonal relationships (INREL), and the fourth important factor was the organizational goals (GOALS).

The important of each factor can be discussed as follows.

1. The roles within the organization (ROLES) were the most important factor for teamwork in organization. It is because working as a team must create an understanding of the work and clearly define roles and responsibilities of team members. Therefore, working as a team would be effective. The roles and responsibilities within the organization of employees can be used the model's framework as a tool to encourage employees to work effectively as a team. As the result, the most influenced observed variable was the commitment and perception of authority, followed by the clarity of roles, and the participation and responsibility. These observed variables made collaboration between the employees easily and ultimately results in effective teamwork. This was similar to the study of Chalita Worasiri (2016) presented that the first important factor of the organizational teamwork in term of the division of labor according to knowledge and competence of Nakhon Ratchasima Highway's staffs was awareness of roles and duties and the ability to work with others, followed by acceptance of responsibility, and achieve team goals. Moreover, the study conducted by Jirapa Janbua and Wanlee Putsom (2021)

showed that there was a positive correlation among work role, work process, work motivation, and teamwork efficiency. In addition, it was also found the significant direct influence between work roles and work motivation, work roles and work processes, work motivation and teamwork efficiency, work processes and work efficiency.

2. The processes within the organization (PROCE) were the second important factor for teamwork in organization. It is because working as a team must have the good processes of working in every organizations. It can be essential for the efficiency and effectiveness of management. The most influenced observed variable of the processes within the organization was coordination and communication. Because of the good communication lead to the same ideas and understanding for collaboration in terms of working times and activities. The second influenced variable was decision process which is a decision from the first to the last step with the correct sequence of the process. The third influenced variable was collaborative control process which is to monitor whether the performance is in accordance with the goals or objectives or not and whether the operation is in accordance with the working standards or not. The result of this study was in accordant with the study of McEwan (2017) on the effectiveness of teamwork training on teamwork behaviors and team performance. McEwan found that the effectiveness of teamwork training related to the teamwork behaviors during working together with the team including actions, communication, coordination, and cooperation of each member. In addition, Carpini, Parker and Griffin (2017) mentioned that the processes of working as a team needed to be clear and the efficiency of teamwork relied on the adaptation of the team members.

3. The interpersonal relationships within the organization (INREL) were the third important factor for teamwork in organization. Because of working as a team need to work together with happily and effectively, it also helps to create cooperation and trust, so the work will be smooth without problems and make the organization successful. The most influenced observed variable of the interpersonal relationships within the organization was unity and cooperation which is an attempt to understand the behavior of the people who work together and to enable them to learn and to analyze problems. The second influenced variable was trust and respect which is about trusting and treating everyone equally no matter how much that person helps to benefit the team. This is the importance aspect of teamwork. The third influenced variable was positive attitude and good working atmosphere which means using a positive attitude to create a positive working atmosphere. It is learning with positive thinking that will result in a good and productive work life. Lencioni (2005) proposed the Five Dysfunctions of a team model that presents the team components in the form of mistakes that can occur from teamwork. The form of mistakes might start with having inappropriate team members, team members are reluctant to be vulnerable with one another and are unwilling to admit their mistakes, weaknesses, or need for help. As a result, without a certain comfort level among team members, a foundation of trust is not possible. Teams that are lacking trust are incapable of engaging in unfiltered and passionate debate about key issues; therefore, it creates situations where team conflict can easily turn into veiled discussions and back-channel comments. In a work setting where team members do not openly air their opinions, inferior decisions are a result. Further, there is also a lack of clarity in assigning tasks and responsibilities; as a result, the team member who assigned to the task may evade the task and the team member will not be interested in the team's outcome. Moreover, Pachsarinya Pongpaew et al. (2020) mentioned that the high-performance teamwork components of the municipality schools consisted of 5 components which are trust, respect, common goals, communication, and cooperation building.

4. The goals within the organization (INREL) were the fourth important factor for teamwork in organization. It is because the goals are the first thing to be clear for working as a team and everyone in organization need to have a commitment for a success of the organization. According to the study, the organizational goals had a very good structural correlation with the empirical data. The organizational goals define what we want to get or what we want to do or whatever needs that we are determined to achieve. Organizational goals are a very important aspect of teamwork for success. The most influenced observed variable was participation and acceptance of goals which is a role in goal setting so that everyone can recognize their common goals for quality work. The second influenced variable was understanding of goals which is the determination of external and internal factors related to the purpose of the organization and its impact on the organization's ability to achieve results based on achievement. The third influenced variable was commitment to work for the goals which is the commitment to work for the organizational goals. It is the intention and diligence to work to achieve the best goals and standards set by the organization. This was similar to Summana Simui (2010) who found that the determination process of the team's tasks and goals was as follows: (1) employees accept and perform according to the tasks and goals that have been set; (2) employees focus on collective goals rather than personal goals; (3) the goals of the organization help your operations be successful; (4) executives and employees collaboratively set tasks and goals in order to monitor the success of the work within the specified time; (5) a clear understanding of the objectives and goals of the plan at every step, (6) meeting together every time when the action plan is updated and amended; (7) employees in the organization have the opportunity to participate to set the goals of the team; (8) executives and employees work together to plan the work to determine the direction of the organization's operations; (9) executives always motivate employees to perform their duties; and (10) executives and employees have to monitor and assess the determined tasks and goals together. Further, Swansburg & Swansburg (2002) said that the goal of the team was the destination and something that is intended to happen or something that must be made to appear. The task targeting activities take place when operational feedback is considered and provided. Personnel will bring the goals and objectives of the work to a meeting to discuss which is an exchange of opinions between each other.

In conclusion, the confirmatory factor analysis of teamwork in organizations using the GRPI model can improve and develop the more effective organizational teamwork system. Moreover, the results of this study is able to apply according to the context of each organization. In addition, the GRPI model can also to implement through cooperation of administator and employees to determine the process of teamwork in the organization effectively according to the goles of that organizations.

6 Recommendation

6.1 Recommendation for the Implementation of Research Rindings

Organizations in the private sector and related agencies can apply the study of organizational teamwork using GRPI model as a basis for developing relationships and teamwork in the organization.

6.2 Recommendation for Future Research

The current study had focus on only the private organizations that represents the distribution of products in specific zones, having warehouses, offices, and transportation departments in economic areas. The future research should study about organizational teamwork using GRPI model in different sectors.

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