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## **EVALUATING THE ROLE OF PROJECT TEAM FACTORS IN DETERMINING THE PROJECT SUCCESS: SCALE VALIDATION**

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### **Abstract**

This study examines the inter correlation between project team factors (personnel, communication, technical task, trouble shooting, and monitoring, and feedback) and success project delivery. It was conducted on 250 employees in four telecommunication companies in Yemen, namely Tele-Yemen, MTN Yemen, Y

Telecom, and Yemen Mobile. Structural educational modeling tool and several statistical methods were used in the data and statistical analysis including the maximum likelihood estimate. Regression techniques were applied to understand the dimensionality of the variables. The results show that project team factors (personnel, communication, technical task, trouble shooting, and monitoring, and feedback) have some positive relationship on project success. Based on the research findings, some theoretical and practical implications were discussed.

**Keywords: Personnel; Communication; Technical Task; Trouble Shooting; Monitoring and Feedback; Project Success**

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## INTRODUCTION

Completing project outputs on cost and on time was the fundamental concern for project managers. Recently project management was regarded as an important factor to reduce the chance of a project failing, to keep to timeframes, to meet the budgeted costs and resources. Across the global economy, every year organisations spend billions of dollars on projects [1,2]. Standish group estimates that in 2013 alone, global annual spending on technology projects used was about USD 750 billion of which the United States accounted for about 40% of it or USD 300 billion, Europe spent about 25% of it or USD 200 billion, Asia account for USD 100 billion, and the rest of the other countries in the world spent the remaining USD 150 billion. The researchers also reported a little increment in project success from 37% in 2010 to 39% in 2012, and about 18% of the projects failed while 43% of the projects were challenged. Researchers also confirmed that there was a main concern on delivering the iron project triangle performance measures (scope, cost and time) creates an “output-focused” mentality [3].

Many research findings have shown that the field of project management has made impressive accomplishments and added significant value to different type of organizations through projects and the products that they complete and deliver [4]. After organizations set their mission, visions and create their strategy, the management team creates individual projects or programs, which are groups of projects managed together. The scope and frequency of project management utilization has speedily improved within the latest years. Gauthier and Ika [5] also noted that over the past two decades, the interest in project management improved substantially [6]. With the substitution increased in the application and usage of project management, there is additionally an increase in the demand for effective project management and project performance [7,8]. Thus, this research aims to further contribute to the body of knowledge by evaluating the application of effective project team factors toward project success.

Today, project management is a major feature within organizations and has become part of their daily operations to accomplish organizational goals. In the other words, Projects are organizational entities which use and implement the right resources and organized them on a new and unique way, for a specific time-frame, to enable positive and clearly defined changes in the business. Literature review revealed a lack of empirical studies showing the relationship between critical success factors (project factors) and the effects that they have on project success [9,10]. The general problem is that, in spite of the increased number of project failures in Yemen, it is still somewhat unclear what makes a successful project. Most of the projects in Yemen have failed to meet expectations. Some projects were cancelled before finishing, others were completed but missed deadlines, blown budgets, faced internal resistance, and the list goes on and on [11]. Given this volatile environment, this thesis seeks to identify the factors that contribute to projects success in the Yemeni telecommunication industries and the role of project management concepts for successful projects.

This research aimed at filling the gap in the literature by assessing the specific and empirical relationship between critical success factors namely the project team factors, in relation to project success.

## **THEORY**

Project team factors involving the abilities and characteristics of team contributors is proposed for the successful completion of projects. The competence of the team members such as communication skills, technical task, troubleshooting, and monitoring, and feedback is also found to be a valuable aspect throughout the implementation levels [12].

Communication CSF is another widely agreed upon CSF in the literature [12-17]. Slevin and Pinto defined communication as offering sufficient flow of valuable project-related information among project stakeholders. Some researchers posited that creating a comprehensive communication plan for the project, followed by timely distribution of project information (objectives, goals, changes and reports) to all stakeholders is a key determinant of project success

The technical tasks or use of integrated project management CSF is another widely cited CSF in the literature. It involves deployment of tools, technology, and processes to project activities to ensure successful project delivery [17,18]. Literature has shown that projects that utilize integrated project management systems (PMS), with the right tools and technology, produce better project outcomes than those that do not [12-15,19].

For the troubleshooting, Cooke-Davies [15] opined that considering the fact that risk is an inherent part of every project's proactive risk identification, analysis, evaluation, and implementation of risk response activities during project implementation is

indispensable to project success. For this reason, Slevin and Pinto [18] encouraged protecting general brainstorming sessions to identify problem areas during project execution, and assignment of designated team members to control specific types of crisis. Troubleshooting has been found in many studies to be a key facilitator of project success (see for reference [12,14,20]).

Monitoring, and feedback CSF is defined as the timely provision of a project's status and progress (budget, schedule, scope, etc.) to all involved stakeholders, for the period of undertaking implementation [21]. It involves convening regular meetings to disseminate project information to all stakeholders, sharing results of project reviews with stakeholders, measuring actual progress towards baseline, as well as monitoring all aspects of the project to provide a snapshot of the project's progress [22].

Slevin and Pinto's CSF personnel covers training, recruitment, use of competent project manager, and team members, to ensure successful project implementation. Several studies have determined that projects that utilize skilled personnel, with the right tools and technology, produced higher outcomes than those managed with low-calibre staff and resources [12,13,23,24].

## **METHOD**

In this study, surveys approach a quantitative data collection method and have been utilized to collect data on project team factors effecting project success by specific employees in the Yemeni telecommunication's industry. The survey methods that were designed more straight with the thoughts, emotions and opinions of participants especially when collecting the information regarding attitudes and beliefs, in addition, the survey method presents extra accurate means of evaluating expertise about the sample and helps the researcher to draw conclusions to generalize the findings from a sample to the population. Furthermore, the survey method is considered to be rapid, economic, efficient, and may effortlessly be administered on a large sample. The empirical research collects data on how factors affect project success by specific employees among telecommunication industries in Yemen. 580 respondents were invited to participate in the study; however, only 250 respondents had fully completed the questionnaire corresponding to a 43.10% response rate. SEM has been used for analyzing the data. SEM software package called Analysis of Moment Structures (AMOS) were used to determine the statistical inter correlation between the test items of each factor. SEM was selected for data analysis because it offers a systematic mechanism to validate relationships among constructs and indicators and to test relationships between constructs in single model [25,26]. Secondly, it offers powerful and rigorous statistical techniques to deal with complex models [26,27]. In SEM, relationships among constructs and indicators are validated by using CFA, also known as measurement model, and relationships between constructs are tested using the structural model [25,26]. In addition, SEM is a multivariate statistical approach that allows researchers to examine both the measurement and structural

components of a model by testing the relationships among multiple independent and dependent constructs simultaneously [28]. Thus, SEM techniques are the most suitable for this study involving multiple independent variables with multiple items.

### **Sampling Method**

Stratified sampling method was used for the reason that this sampling method presents richness and accuracy of data from respondents of different strata. This sampling method was considered practical when the study goals at acquiring differentiated information from more than a few strata. Moreover, Stratified sampling used to obtain estimates of known precision for certain subdivisions of the population by treating each subdivision as a stratum.

After the population was stratified, a certain percentage of respondents were drawn out from each stratum. Tashakkori and Teddlie [29] highlighted that the probability sampling technique includes selecting a somewhat large number of units from a population, whereby the probability of inclusion for every member of the population is determinable. The important reason of the probability samples in quantitative studies is to attain representativeness to the extent in which the sample accurately represents the entire population.

### **Sample Size**

The role of sample size is crucial in all statistical analyses. Researchers have emphasized that, the more sophisticated the statistical analysis, the higher the sample size needed. For that reason, the sample size requirements in this study are based on structural equation modeling (SEM). Although the required sample size is 232 but 250 have been taken as sample in order to get more accurate results.

## **RESULTS**

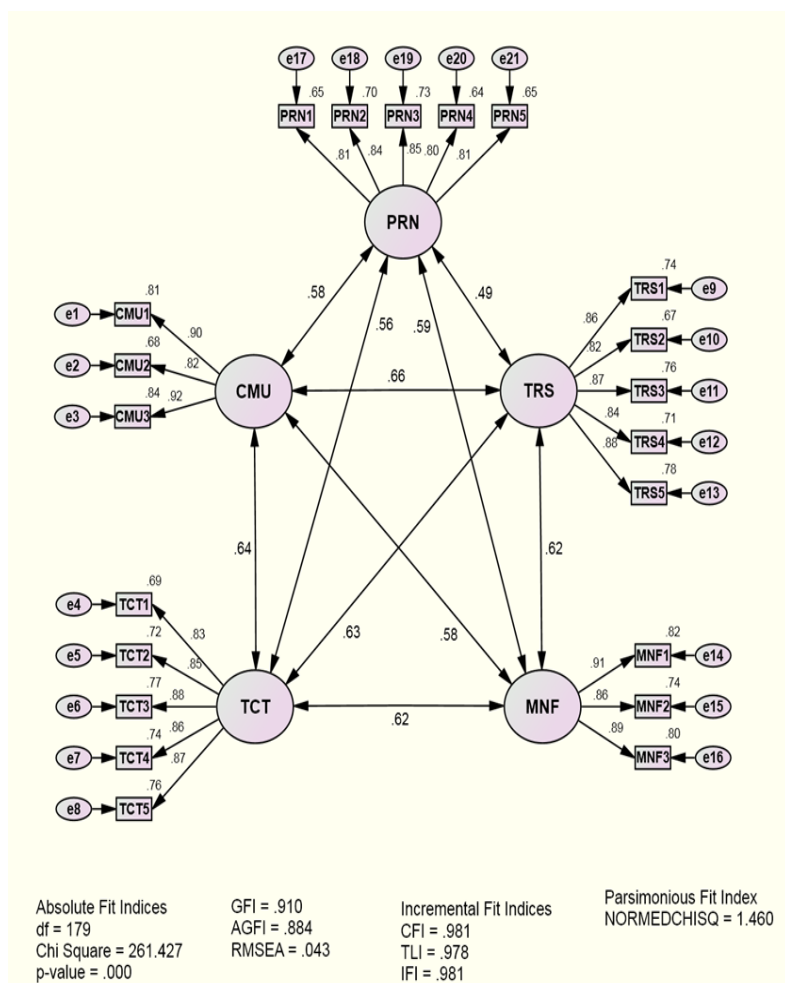
A total of 250 respondents were used for analysis and the sample consisted of 78.40% male and 21.60% female. In term of age, 46.8% were below 35 years old while 7.6 percent were above 45 years old. On the marital status, 62.0% were married and 38.0% were single. Majority of the respondent, i.e. 28.8% and 21.2% were from IT and Engineering respectively. Majority of respondents i.e. 40% were with Master degrees, 34.40% with Bachelor Degree, 11.20% with Doctorate holders, 10.0% with Diploma, 2.40% attended High School, and 2.0 percent with Professional Certificate.

A total of 48.8% of the respondents had worked in the organization for less than 5 years, while 35.60% had worked between 5 to 10 years. A total of 27 respondents or 10.8% had been in the current job position for more than 10 years while the rest were more than 16 years. Finally, 28.40 and 20.8% of the respondents were from middle and top management position respectively. Only 18.0% were from senior

management, and the rest of the respondents were holding Supervisory and Subordinate position.

### CFA Model for Project Team Factors (PTF)

This model was made up of 21 items to measure 5 first-order constructs, namely Communication (CMU), Trouble Shooting (TRS), Technical Task (TCT), monitoring, feedback (MNF) and Personnel (PRN). The initial Team Factor CFA model with all 21 items was portrayed in Figure 1.



**Figure 1:** CFA Model for project team factors with 21 Items.

The GOF results of the CFA for project team factors with 21 items indicated that the model adequately fitted the data. Chi-Square=261.427, df=179, p=0.000, GFI=0.910, AGFI=0.884, CFI=0.981, TLI=0.978, IFI=0.981, RMSEA=0.043 and NORMEDCHISQ=1.460.

## Reliability and Convergent Validity

Table 1 represents the result of Cronbach's alpha and convergent validity for the CFA model of project team factors with 21 items (Table 1).

**Table 1:** Results of Cronbach's alpha and convergent validity for project team factors.

Construct	Item	Factor Loading	Average Variance Extracted (AVE) <sup>a</sup>	Composite Reliability (CR) <sup>b</sup>	Internal Reliability Cronbach's alpha
Communication (CMU)	CMU1	0.901	0.778	0.913	0.911
	CMU2	0.824			
	CMU3	0.919			
Trouble Shooting (TRS)	TRS1	0.859	0.734	0.932	0.932
	TRS2	0.821			
	TRS3	0.871			
	TRS4	0.845			
	TRS5	0.885			
Technical Task (TCT)	TCT1	0.828	0.734	0.933	0.932
	TCT2	0.85			
	TCT3	0.875			
	TCT4	0.861			
	TCT5	0.87			
Monitoring and Feedback (MNF)	MNF1	0.908	0.785	0.916	0.916
	MNF2	0.858			
	MNF3	0.892			
Personnel (PRN)	PRN1	0.807	0.675	0.912	0.912
	PRN2	0.839			
	PRN3	0.854			
	PRN4	0.798			
	PRN5	0.807			

As shown in Table 1, all indicators have high factor loadings ranging from 0.798 to 0.919 indicating that the factors have been preserved by these indicators. The AVE values, were above the cut-off 0.5 as suggested by Nunnally and Bernstein [30],

ranged from 0.675 to 0.785. The composite reliability values exceeded the recommended value of 0.6 as recommended by Bagozzi and Yi [31], ranged from 0.912 to 0.933. The Cronbach's Alpha values were above the cut-off 0.7 as suggested by Nunnally and Bernstein [30], ranged from 0.911 to 0.932.

### Discriminant Validity

Table 2 represents the discriminant validity of the CFA model for project team factor. It can be seen clearly that the inter-correlations between the five sub-constructs in project team factors ranged from 0.492 to 0.657, which were below the threshold 0.85. Further, as shown in Table 2, the correlations were less than the square root of the AVE by the indicators, demonstrating good discriminant validity between the project team factors.

**Table 2:** Discriminant validity of CFA model for project team factors.

	CMU	TRS	TCT	MNF	PRN
Communication (CMU)	0.882				
Trouble Shooting (TRS)	0.657	0.856			
Technical Task (TCT)	0.635	0.627	0.857		
Monitoring and Feedback (MNF)	0.583	0.618	0.615	0.886	
Personnel (PRN)	0.581	0.492	0.561	0.585	0.821
Note: Diagonals represent the square root of the AVE while the other entries represent the correlations.					

Upon examining goodness of fit of the data, convergent validity and discriminant validity of the CFA model, it can be summarized that the measurement scale to assess the constructs and their relative items in project team factors was reliable and valid.

## DISCUSSION

The study contributes to the development of instruments to examine the project team factors towards the project's success. The results of the confirmatory analysis support that the project team factors are multidimensional construct. This finding is in keeping with previous studies of projects team factors which, however, had examine technical task and communication toward project success [12,32,33] rather than the other factors such as personnel, trouble shooting and monitoring and feedback.

As expected, the study corroborated prevalence of distinct, although somewhat interrelated, dimensions of project team factors. The inter-correlations between the five sub-constructs in project team factors ranged from 0.492 to 0.657, which were below the threshold 0.85. It can be emphasized that the measurement scale to assess the constructs and their relative items in project team factors was reliable and



valid. The results of this research are consistent with those of prior research. The finding has provided empirical evidence on the project team factors play an essential part for determining a successful project, furthermore, this finding implies that those team who have skill such as communication and troubleshooting are playing an important role in determining the completion of successful projects.

This study has important implications for Yemeni telecommunication industries that have never assessed the different variables that affect their projects success. Understanding such factors as communication, trouble shooting, technical task and monitoring and feedback would be important in improving the implementation of project management throughout the industry. Thus, the findings from the study contributed to the knowledge base of organization and management as it explored the identified independent variables and reported on the empirical evidences that explain how project team factors play an essential part to deliver a successful project.

## **CONCLUSION**

Overall, the results from the study showed strong support for the relationship between project team factors and the project success. In addition, the highest effect on project success was due to the trouble shooting and trouble task, which provided strong support for the use and application of the Project Implementation Profile (PIP) to effectively and practically assess projects and make improvements on the projects whenever, there are identified weak areas based on the assessment.

The results from the study confirmed that it is important for organizations to champion and align with appropriate critical success factors that can contribute to the improvement of project success. This study adds to the body of knowledge in the areas covering the relationship between critical success factors more specifically project team factors. This study also contributes to the body of knowledge that provide tools and concepts for educating current and future project managers on the effective methods of improving their perspective probability or chances of achieving project success.

## **LIMITATIONS**

We acknowledge two limitations to our study that suggest potential fruitful opportunities for future research. First, we acknowledge that the generalizability of results may be limited because our data were collected from telecommunication industries in the one country: Yemen. In this case, it might be useful to see if our findings replicate in other country. Second, the study planned to collect the data using both qualitative and quantitative methods so that the data gathered could have been more varied and rich to enable the researcher to provide qualitative explanations for the impact of project team on project success in telecommunication sector. However, due to the current situation in Yemen, such approach was not

feasible. In other words, the conflict that currently exists in Yemen prevented the researcher from conducting interviews with the target sample (top management). However, the study succeeded in obtaining the valid finding by using one method which is quantitative methods to achieve the study goals.

## **RECOMMENDATIONS FOR FURTHER RESEARCH**

This study examined the inter correlation between project team factors towards project success. Based on the research results and findings from the study, it is recommended that further research be conducted on the relationship between empowerment, commitment, technology, culture and team work with a larger sample. Given that this study was conducted with project managers based only in Yemen, a similar study can be conducted with project managers from various countries to assess whether there are variations in terms of the countries, ethnicities, or cultures of the project managers.

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