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Critical Success Factors of Project Management : The Case of Construction Related Projects in Vietnam

Viet Quoc PHAM[1], Bao Khac Quoc NGUYEN[2], Binh Van TU[3], Huong Thi Thanh PHAM[4], Thanh Quoc LE[5]

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Abstract

The study aims to contribute to the improvement of project management in Vietnam. It focuses on developing new critical success factors (CSFs) which can be used to assess the success of project management in the country. This is a promising issue considering the rapid changes occurring within the business environment. The reason is because CSFs carry great consequences on project management issues, particularly in the context of Vietnam, which is currently experiencing many big scale projects involving both local and foreign investors. Two applications are utilised. One is to adapt the business model of Belassi and Tukel (1996) to observe the transitional and emerging economy of Vietnam. The other is to examine the data collected from a survey to examine the new CSFs which can then be used to assess the success of its projects and project management in Vietnam. The research results showed some remarkable differences between CSFs of Vietnam and foreign countries in both number of success factors and its impact levels which should be paid attention by foreign project managers/owners when doing investment and project management in Vietnam. The outcome generated can be useful to project owners/managers as well as policy makers in Vietnam's business environment.

Keywords: Project Management, Critical Success Factors, Project Management Success, Vietnam.

JEL Classification Code: G11, G31, L74, M19, O15.

1. Introduction

Since the invention of the Gantt chart in the early 1900s, research focusing on project management has had considerable development (Burke, 1999). In the 1950s, researchers focused on progress/schedule optimisation so as to gain an understanding of making project management more effective (Belassi & Tukel, 1996). By the end of the 1960s and 1970s, the school of "Critical Success Factor" was started and the term "Critical success factor (CSF)" was introduced for project managements (Rockart, 1979). Following this, CSF-related studies of project management developed rapidly and it dominated the research context in the 1980s and 1990s. However, these studies were confined to only a few types of projects and some typical CSFs, hence the generalisability of these findings was not high.

In order to overcome these limitations, Belassi and Tukel (1996) introduced a comprehensive framework for identifying success/failure factors of project management. This research framework allows CSF keys to be located within a group of closely related CSFs. The framework facilitates the classification of CSFs; it also helps to explain the CSF's impact on the success of the projects or project management. Undoubtedly, the identification and affirmation of these CSFs will assist project managers and policy-makers such that they can implement good work practices with regards to the project management of big projects in

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1 First Author and Corresponding Author. Dean, UFM Graduate School, University of Finance-Marketing, Vietnam [Postal address: 2C Pho Quang Street, Tan Binh District, Ho Chi Minh City, 72108, Vietnam] E-mail: vietpq@ufm.edu.vn
2 Associate Professor, School of Finance, University of Economics Ho Chi Minh City, Vietnam. E-mail: nguyenbao@ueh.edu.vn
3 Associate Professor, School of International Business–Marketing, University of Economics Ho Chi Minh City, Vietnam. E-mail: binhtv@ueh.edu.vn
4 Lecturer, School of Economics and Management, Hanoi University of Science & Technology, Vietnam. E-mail: Huong.PhamThiThanh1@hust.edu.vn
5 Lecturer, Institute of Applied Research, University of Finance-Marketing, Ho Chi Minh City, Vietnam. E-mail: lehaiduong68@gmail.com

this country, thereby increasing the success rate of their work and enhancing the confidence of investors. This outcome can generate a higher rate of "successful projects" being implemented in this country which is the final expectation of any investor.

Due to the rapid changes happening in today's business environment, it is likely that the number of CSFs will also change their impact on the success of the project management. Following the research on the CSFs done by Belassi and Tukel (1996), there has been very little extensive research done to explore new CSFs, especially in the context of project management in emerging economies in Asia. As a developing economy, Vietnam has many large-scale projects happening in key areas such as transport infrastructure, telecommunications, petroleum and domestic constructions. This reality makes it a necessity for researchers to explore how CSFs can be utilised to ensure that these projects can proceed with success. This study attempts to uncover new CSFs as well as to confirm the impact of previously discovered CSFs, in the current context of project management in Vietnam. The key research question this study aims to answer is: What are the new CSFs affecting the success of project management in the current project management environment of Vietnam?

2. Literature Review

2.1. Project Success and Project Management Success

The topic of project success is a controversial one because there has been difficulty in getting a common consensus among researchers. For instance, Baccarini (1999) mentions that it is difficult to measure project success if there is no unification in the concept of what success means. He also points out two different concepts including "project success" and "project management success", which he says are somewhat different. It is a widely accepted notion that project management success is measured mainly on three criteria: cost, quality and time while product success depends much more on many other factors which exist during the operational phase.

De Wit (1988) suggests that the word "project success" can be deemed as "meeting the general project objectives" while the term, "project management success" has been traditionally referred to as "the completion status within a pre-determined budget, quality and time". Following the above definition, this study will concentrate on project success in the period of project management or so-called "project management success". Therefore, the project success criteria included into the current study will encompass the so-called Iron Triangle of cost-time-quality (Atkinson, 1999). These criteria are widely accepted by many researchers such as Pinto and Slevin (1988), Kerzner (1992), Wateridge (1995), Lim and Mohammed (1999) and Turner (2009). An additional and valuable criterion which is repeatedly found by recent research is "meeting clients' requirements" as noted by Fortune and White (2006) and Westerveld (2003) who described it as "clients' appreciation", is further included. These four main criterions may be the most ideal criteria to be used for measuring project management success.

2.2. Factors Affecting Project Management Success

In order to successfully complete a construction-related project, the project owner/manager must take care of the CSFs that can affect the success of the project management. This needs to be monitored from the initial stage until the completion of the project. Past studies have shown that during this process, project owners/managers may need to oversee a number of processes such as the project scope (Walker, 1995; Cooke-Davies, 2002; Chan, Scott, & Chan, 2004), the level of complexity and the scale of the project, the social and political CSFs as well as the technical CFSs or the management tools involved (Akinsola et al., 1997; Chan et al., 2004; Chan & Kumaraswamy, 2002). Although these studies have been focusing on the CSFs of projects, they have mainly looked at the analysis of certain types of projects only, hence they only focused on specific CSFs. Consequently, these research results may seem useful for assessing some projects of a similar nature in a similar management context but their generalisability is low. The outcome is that this makes it difficult to apply the uncovered CSFs onto other types of projects.

The CSFs uncovered by Belassi and Tukel (1996) were based on a general model. In this framework, the CSFs were divided into four groups: (1) CSFs related to the capacity/ability of the project manager and the project team members who managed the project, (2) CSFs that were related to the project characteristics such as the scale, value, urgency and others, (3) CSFs that were related to the organisation of the project team and relevant management organisations and (4) CSFs that were related to external environments such as the macroeconomic factors, political factors, social stability and others. These four groups of factors affect the success rate of the projects and they became known as the "System Response Model" (Belassi & Tukel, 1996, p.144).

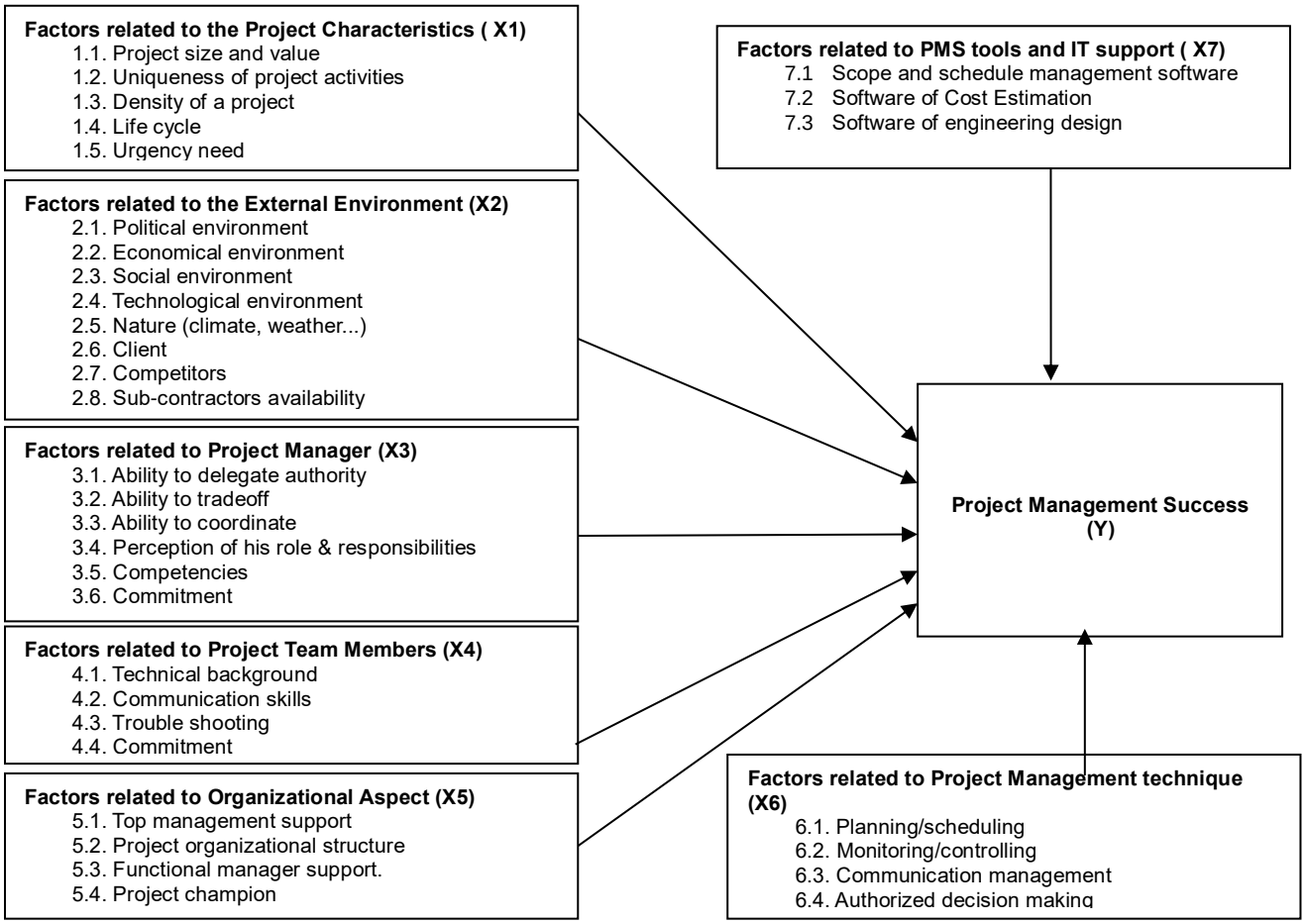
Some Vietnamese researchers such as Duy Nguyen, Ogunlana, and Thi Xuan Lan (2004) and Thi and Swierczek (2008) have applied the model of Belassi and Tukel (1996) in the context of Vietnam. These researchers also used survey data generated from Vietnam, similar to Belassi and Tukel (1996). However, these researches that had been

conducted in the context of Vietnam were restricted by some limitations such as: (1) there was no adequate adjustment of Belassi and Tukel's (1996) model in the Vietnamese context and (2) expert criteria were unclear, making the survey data generated to be less reliable. These limitations do not allow for the full detection of new CSFs or CSF groups that may emerge in the context of Vietnam. Aiming to address this gap, the current study is also applying Belassi and Tukel's (1996) model. A mixed method comprising the qualitative and quantitative approach is applied so as to adjust Belassi and Tukel's (1996) model to the Vietnamese context. This will be modified before the extensive survey is conducted and before the validation of the survey questions. Further, the current study will also pay special attention to the selection of project specialists who have experience in project management so as to enable them to contribute to this study. In this way, the reliability of the data collected is increased.

3. Methodology

3.1. Qualitative Approach – The In-depth Interview

This study begins with the qualitative approach where an in-depth interview with senior experts who were involved in project managements was conducted. These personnel were selected based on the criteria that they must have 10 years or more of work experience as project managers in the field of transportation, telecommunications, electricity, petroleum and industrial construction. Based on the recommendations of Belassi and Tukel's (1996) model, a set of semi-structured interview questions was developed and the two key questions noted in the in-depth interview are: (1) Among the CSFs identified, which one among them exist or do not exist in the project managements of Vietnam? (2) What are the new CSFs detected to be existing in current day Vietnam?



Source: Based on model of Belassi and Tukel (1996)

Figure 1: The Regression model

After each interview, the contents gathered were summarised and returned to the experts via email for confirmation. This process was conducted so as to protect the consistency of the data gathered with the selected experts' ideas. Following eight (8) interviews, it was found that there was no further or new information to be gathered from the interview due to saturation point.

Based on the interview results and analysis, the new research model was formed, as shown in Figure 1 (Regression model). When compared to the model of Belassi and Tukel (1996), it appears that some CSFs had been removed and two new CSF groups were identified and added to the regression model. The new CSF groups include those that were related to: (1) project management tools and those that were related to (2) project management and design software (PMS). Each group of the CSFs detected comprised individual factors which may have direct or indirect impact on the project success. All these factors were allocated in the modified model and it was called the "system response" as is shown in Figure 1 below.

3.2. Quantitative Approach – The Regression Model

Based on the regression model which was modified from Belassi and Tukel (1996), the regression equation stated below was applied:

$$Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + \beta_5 X5 + \beta_6 X6 + \beta_7 X7 \quad (1)$$

where

Dependent variable Y is project success in the period of project management.

β_0, is constant

β_1, β_2, β_3, β_4, β_5, β_6 and β_7 are coefficients correspondent to X1 to X7

X1, X2, X3, X4, X5, X6 and X7 are independent variables representing seven groups of factors which are shown in the Figure 1.

3.3. Data Collection – Pilot Study

Data were collected from the administration of a self-completed questionnaire (Dillman, 2000) whereby 20 project experts were asked to assess the impact of each CSF, based on the 9-point Likert scale. The questionnaires were dispatched by email to 20 leading project managers who were currently working in Vietnam as pilot survey prior to the actual large-scale survey. Following the pilot study, the questionnaire was revised and 700 were then dispatched by email to the respective project experts who are currently working in large projects in Vietnam. The number of questionnaires that were returned amounted to only 161, which accounted for 35.1% of the return rate. After reviewing and eliminating some of the inadequately completed questionnaires, the useable ones came to a total of 133.

4. Results and Discussion

4.1. Factor Analysis

At first, data were analysed by using the Measures of Sampling Adequacy (MSA). The outcome generated was considered diagonal to the Anti-image Correlation Matrix if the MSA value was less than 0.5. This is then removed. As a result of this, the final number of suitable variables remained at 38 instead of 39. It was stated at the beginning that 34 observation variables stood as representatives of the factors that influenced the success of project managements. The observation variable of 5.1 (political stability with anti-correlation of 0.49) was also removed, leaving the balance of four remaining observation variables as the success factors of project management. The sample size remained unchanged at 133 and this was considered as sufficient for conducting the factor analysis.

To ensure a satisfactory exploratory factor analysis for the data, some values were considered. First, the KMO (Kaiser-Meyer-Olkin) coefficients must be equal or greater than 0.5 and second, the significance of the Bartlett's Test must be less than 0.05. As shown in Table 1, the KMO results fulfilled the standard requirement. In addition, the factors loaded must have Eigenvalues of above 1. Therefore, the eight groups of factors were extracted due to their Eigenvalues which were larger than 1.

Table 1: Barett test and KMO test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.899
Bartlett's Test of Sphericity	Approx. Chi-Square	3413.225
	Df	561
	Sig.	.000

Based on the Varimax rotation, 34 factors were catogorised into seven groups of factors. One new group, Group 8, was categorised based on the four former factors gathered from the other groups. Thus, Group 8 comprised factors such as: (1) the big number of contractors participating in the project, (2) the uniqueness of the project, (3) the requirements of customers and (4) the competitors of the project as Table 2 below.

Table 2: Rotated Component Matrix[a]

	Component							
	1	2	3	4	5	6	7	8
Group 1: Factors related to Project Manager								
3.5 General management skills	.846							
3.4 PM Role & Responsibility	.845							
3.6 PM commitment	.824							
3.3 Coordination	.811							
3.1 Delegate authority	.801							
3.2 Keep trade-off	.738							
Group 2: Factors related to Project Team								
4.4 Commitment		.758						
4.3 Trouble shooting		.751						
4.1 Technical background		.737						
4.2 Communication skill		.628						
Group 3: Factors related to Project Characteristic								
1.2 Project Value			.818					
1.1 Project size			.800					
1.5 Project life cycle			.777					
1.4 Density of project activities			.758					
1.6 Urgency of project delivery			.533					
Group 4: Factors related to PMS tool								
7.2 Software of cost estimation				.883				
7.3 Software of engineering design				.863				
7.1 Scope/schedule management software				.745				
Group 5: Factors related to External Environment								
2.3 Social environment stability					.777			
2.4 Technology environment stability					.740			
2.5 Stability of nature					.664			
2.2 Economic environment stability					.583			
Group 6: Factors related to Organization								
5.3 Function manager support						.808		
5.4 Project champion						.687		
5.2 Project organizational structure						.598		
5.1 Top management						.541		
Group 7: Factors related to Project management technique								
6.2 Monitoring/controlling							.695	
6.3 Communication management							.665	
6.1 The planning & scheduling							.638	
6.4 Authorized decision making							.623	
Group 8: New group of factors								
2.8 Sub-contractors								.649
1.3 Uniqueness of project activities								.646
2.6 Client requirement								.608
2.7 Competitors								.604
Cronbach's Alpha	0.95	9.10	0.85	0.89	0.73	0.88	0.92	0.61
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.								
a. Rotation converged in 8 iterations.								

In order to test the reliability of those factors, Cronbach's Alpha was employed. The value of the Cronbach's Alpha for the eight groups were noted to be above 0.7. This shows that the eight groups have a relatively high internal consistency. From the perspective of previous theoretical and empirical studies, the CSFs in Group 8 were hypothesised to have a positive relationship/effect with project management success. This hypothesis (H8) is shown in Table 6. Following this, it should be combined with the eight groups in the regression model as the new econometric function. The equation used is stated as:

$$Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + \beta_5 X5 + \beta_6 X6 + \beta_7 X7 + \beta_8 X8 \quad (2)$$

4.2. Regression Results

The estimated results gathered from the factor analysis are presented in Table 3 and Table 4 below. They show that function (2) is good for fit because value F of the model is significant at any level. With $R^2 = 0.455$, the result shows that the independent variables provide 45.5% of information which can explain the dependent variable.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate.
1	.675[a]	.455	.420	.76423683
a. Predictors: (Constant), X8, X7, X6, X5, X4, X3, X2, X1				

Table 4: Analysis of Variance (ANOVA)[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	59.996	8	7.500	12.840	.000[a]
	Residual	71.839	123	.584		
	Total	131.835	131			
a. Predictors: (Constant), X8, X7, X6, X5, X4, X3, X2, X1						
b. Dependent Variable: Y as project management success						

The estimated values of the study are presented in Table 5. By substituting these values according to function (2), we have acquired the regression function which was fortified with values such as those noted below:

$$Y = -0.03 + 0.254\,X1 + 0.352\,X2 + 0.307\,X3 + 0.089\,X4 + 0.149\,X5 + 0.102\,X6 + 0.302\,X7 + 0.210\,X8 \quad (3)$$

Table 5: Estimated results of the Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.003	.067		-.046	.963
	X1	.254	.067	.253	3.800	.000
	X2	.352	.067	.350	5.265	.000
	X3	.307	.067	.306	4.596	.000
	X4	.089	.067	.089	1.335	.184
	X5	.149	.067	.149	2.232	.027
	X6	.102	.067	.102	1.529	.129
	X7	.302	.067	.301	4.520	.000
	X8	.210	.067	.210	3.148	.002
a. Dependent Variable: Y as project management success						

4.3. Hypothesis Testing

Based on the results of the regression model presented in Table 5, the hypothesis development derived from literature review could be concluded as those seen in Table 6.

Table 6: Summary of Hypothesis Testing

Hypotheses	Description	Results of Hypothesis Testing
H1	There is negative impact between strength of project characteristic factors and project success.	Supported
H2	There is positive impact between the level of stability of external environmental factors and project success.	Supported
H3	The competencies of project manager have the positive impact on the project success.	Supported
H4	The competencies of project team members have positive impact on the project success.	Rejected
H5	The level of support from the organizational factors has positive impacts on the project success.	Supported
H6	The support from the project management techniques factors has the positive impact on the project success.	Rejected
H7	The support from the PMS tool has the positive impact on the project success.	Supported
H8	Re-ordered group of factors has positive relationship with the project management success	Supported

Results in Table 6 indicate that X1, X2, X3, X7, and X8 were significant at any level. The X5 factor was significant at 5% level while X4 and X6 were non-significant. All the coefficients were positive. Based on this, the first conclusion drawn is that project management success, serving as the dependent variable y, has a positive linear relationship with

all the independent variables included in the model, except for X4 (project management software) and X6 (organisational factors).

5. Conclusion and Suggestions

5.1. Conclusion

The success of a project is difficult to assess because of two major components. The first is related to the success of the project management period and the second is related to the success of the operational period of the project (i.e. the product/service that the project provides). Through the review of the previous researches, it is possible to conclude theoretically, that "the success of the project management" will increase the probability of the success of the project. Successful project management depends on many types/groups of CSFs. These CSFs or CSF groups may change over time due to project types or other factors. Based on this, it is therefore important that new research be conducted to investigate the new contexts so as to develop a new set of findings or new methods which can be utilised to detect any possible differences or changes occurring in the CSFs. In this research, Groups 6 and 7 were noted to be the two new CSF groups that were proposed and put into practice.

5.2. Main Findings

According to the results of the test, the results generated carry some implications related to project management and policy development, both of which may be relevant to the project governance of Vietnam. Except for the two factors of X4 (project management software) and X6 (project organization), the remaining factors showed a positive impact on the successful management of the Y project. In this research, the new group of factors identified and confirmed was made up of instrumental/technical factors used in project management. They include: Planning and scheduling, Monitoring and oversight, Cross-departmental information management and Making authorised decisions. This outcome suggests that project managers need to focus on these tasks in their project managements to ensure success. The policy-makers also need to consider legislating these skills for project experts. This requirement can be achieved by making implementations for training so that these experts can attend such courses concerning tools/techniques, thereby accelerating the success rate of project managements. This outcome can be seen to be consistent with the test result of Group X2-Personnel, which had the greatest impact on the success of project management, bearing a coefficient of + 0.352.

In addition, the impact coefficient of the personnel factor - X2, carrying the value of 0.352 was greater than the coefficient of factor 1-the project manager which carried the value of 0.254. This slight difference suggests that the project members, in comparison to the project managers, have a greater impact on the project management success. This outcome contradicts the theories drawn from overseas' research which showed that the project managers' capacity (X1) often has a stronger impact than the project members, X2. There is a possibility that most of the large and medium projects in Vietnam had been financed by the state budget. Therefore, the managers and the deputy managers of the projects tend to be appointed, based on personal relationships rather than their management skills. This outcome is consistent with the findings noted by Thi and Swierczek (2008). In this regard, an important policy implication gained from this study is that state management agencies need to increase the standard or the quality of the project managers. They also need to find new ways to choose their project managers so as to increase the quality of these people as well as to enhance their project managers.

In this study, factor X6 (Non-project Environment) was composed of several individual factors including Leadership support, Support of the project management structure, Support of functional departments and Priority of the project. The result showed that there was a lack of evidence that can be drawn to conclude that environmental factor has a positive effect on the success of project management, which was expected. This result is contrary to the experimental results noted in developed countries which had shown that there was a linear relationship between environment and the success of the project. The outcome noted in this study is considered as outstandingly different. Therefore, this discrepancy needs to be adequately addressed by future experimental studies and comparative researches looking at project management mechanisms, particularly those between Vietnam and developed countries.

5.3. Limitations and Recommendations

Pinto and Slevin (1988) had noted that CSFs are able to change throughout the project management process. This includes the stage of: project formulation, development, implementation and project complement/handover. It was also observed by Pinto and Slevin (1988) that CSFs can change the degree of impact, the quantity and others. The current study, however, did not distinguish the two stages involved in project management. Therefore, future studies may want to take these four stages of project management

into consideration so as to be able to detect CSFs that are meaningful to project managements in the context of Vietnam.

The next limitation is related to the method of data collection where the data were gathered based on the judgment of experts and not others. In this regard, the reliability of the data may be limited to the project setting and Vietnam only. Future studies may bring in experts from other countries so as to make the input more diverse. At the same time, the study also uncovered a large difference in the direction of the impact caused by X6 which includes the reliability and the size of the data. Therefore, future studies may consider using a larger sample size and to conduct observations at several phases of project management so as improve the reliability of the research.

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