THE EFFECT OF HUMAN RESOURCE COMPETENCIES ON PROJECT PERFORMANCE IN VIETNAMESE INFRASTRUCTURE PROJECTS

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1. INTRODUCTION

Since 1980, many academics and practitioners have agreed that human resource management is one of the most crucial elements of an organization's success. Project management has become a key activity in most modern organizations [2]. The Project Management Institute in its official definition of Project Management Body of Knowledge (PMBOK) included human resource management as one of nine fundamental basic functions of project management [3]. However, the results of the empirical studies conducted by Pinto and Prescott [4], and by Belout and Gauvreau [2], contradict this emphasis. Pinto and Prescott concluded that the 'Personnel factor' was not a dominant variable for project success at any of the life cycle stages. Belout and Gauvreau indicated that the 'Personnel factor' did not have an impact on dependent variable of project success.

This study attempts to respond to their controversial findings. This study will investigate the effects of human resource competencies on project performance of infrastructure projects in Vietnam, a developing country.

This study will consider key project factors of human resource competencies as they relate to project performance criteria. It assesses infrastructure projects in Vietnam to examine the relationship between these factors and the performance of projects.

2. LITERATURE REVIEW

2.1. Project Performance Criteria

One focus of project management research has been on establishing the attributes of effective project performance and the factors that facilitate effective project performance. Traditionally, project performance had been defined in term of meeting cost, time and quality criteria [5].

Tukel and Rom reported an empirical study conducted in the USA to determine the performance measures project managers commonly use to evaluate the success of their projects [6]. Specifically, they identified the project manager's orientation toward using internal and/or customer driven measures of performance. In general, they found that the project manager's primary measure is quality and their most important objective is meeting customer needs.

According to Kerzner [7], project performance was defined as the completion of an activity within the constraints of cost, time, and performance. This definition of excellent performance has been modified to include completion within budgeted cost, within the allocated time period, at the proper specification level and the customer's satisfaction.

2.2. Key Project Factors of Human resource competencies

The search for critical project factors has been continuing for more than three decades. Most early studies in this area focused on the reasons for project failure rather than project success. Rubin and Seeling [8] investigated the relationship of the project manager's experience on the project's success or failure. The findings indicate that a project manager's previous experience had a minimal impact on the project's performance [9]. The size of the previously managed projects did not influence the manager's performance. Avots identified the reasons for project failure and concluded that the wrong choice of project manager, the unplanned projects termination and unsupportive top management were the main reasons for failure [10]. Hughes

conducted a survey to identify the factors that affect project performance [11]. He concluded that projects fail because of the improper focus of the management system, by rewarding the wrong actions, and the limited communication of goals. However, to understand failure does not guarantee success in the future. Replicating the critical success factors in new projects has been suggested as the more effective approach to improve project performance [12].

Belassi and Tukel [1] grouped critical success factors into four areas: external environment, project manager and team members, organization, and the project. The identification of critical factors would lead to the better evaluation of projects. Critical factors are linked to their effects which lead to project success or failure. The identification of this cause-effect relationship would improve project performance [13].

In summary, most previous studies consider that project performance criteria should include cost, time, technical performance and customer satisfaction. This means the success of a project was defined as the completion of an activity within budgeted cost, within the allocated time period, at the proper technical performance and with acceptance of the customer [7]. Many studies in project management have presented human resource competencies factors including two main components of manager and team members of project. Key project factors of human resource competencies need to be determined as successful based on the level of performance accomplished. There is limited research on the strength of the relationship between the human resource competencies and project performance. Some results of the empirical studies concluded the 'Personnel factor' did not have an impact on project success. This contradicts the trend in project management in which the human resource competencies usually plays important role in the success of organizations or in the performance of projects.

3. HYPOTHESIS

In the literature, many factors related to the competencies of project managers and team members have been proposed for the successful completion of projects. These factors not only affect project performance but they also have an impact on client satisfaction and project acceptance [14]. Pinto and Slevin [15] demonstrated the importance of selecting project managers who possess the necessary technical and administrative skills for successful project completion. The project manager's competence becomes most critical during the planning and termination stages [16]. The competence of the team members is also found to be a critical factor throughout the project cycle [17]. Similarly, well-established communication channels between the project manager, the organization and the client are necessary for the acceptance of the project outcome by the client. Thamhain [18] conducted a field study to examine the influences of the project environment on team performance and resulting project performance. He found a positive relationship between team involvement and performance especially in complex project environments.

This discussion leads to specific hypothesis about the relationships between the human resource competencies, including project manager and team members' competencies, and project performance.

Hypothesis: In a project, the higher the competencies of the project human resource the better the project performance.

4. RESEARCH METHODOLOGY

4.1. Operationalization and measurement

This study will examine the effects of human resource competencies on the project performance. The indicators of project performance and its antecedent factors of human resource

competencies will be measured by the perception of project managers of infrastructure projects in Vietnam.

The indicators of project performance will be cost, time, technical performance and customer satisfaction as used in previous studies. The measurement of these concepts focuses on capturing the extent to which a project has been successful based on results. The indicators of human resource competencies are mainly based on the two sets of factors that developed by Belassi and Tukel [1]. These indicators are the project manager competencies and the project team member competencies. In this conceptual framework, two factors of project manager competencies and team member competencies are considered as first order constructs; and human resource competencies are treated as higher order construct. The competencies of project manager are measured in terms of: ability to delegate authority, to negotiate, to coordinate, to make decisions, and to specify role and responsibility. The competencies of project team members are measured specified as: technical background, communication skills, trouble shooting, commitment, problem solving, and teamwork.

4.2. Research design

The research setting is infrastructure projects in Vietnam. The questionnaire was designed to include a description of the project in terms of demographic characteristics, a perception of project performance and a perception of project factors of human resource competencies

The questionnaire required respondents to think of a project in which they were currently involved or had recently completed. This project was to be their frame of reference for completing the questionnaire. The questionnaire includes 10 questions related to project characteristics, 4 questions related to project performance, 11 questions related to project factors of human resource competencies, and a few open ended questions. Each item about project performance and project factors of human resource competencies were measured on scale ranging from 1: strongly disagree to 7: strongly agree. Data were collected using a self-administered survey. Questionnaires were mailed to 1000 potential respondents, who were involved in infrastructure projects in Vietnam. 239 usable questionnaires were returned, a response rate of approximately 24%. Finally, a focus group was also conducted with the project professionals in infrastructure projects in HoChiMinh City to discuss about the counter intuitive results identified in this research. There were 21 participants in the focus group.

4.3. Descriptive statistics

A frequency analysis is conducted for questions related to background of the project. This information includes the position of respondents in the project, type of project, ownership, number of activities, total budget, organizational structure, stages of project, and work experience of members. 69% of the projects were state owned. Nearly half of the projects averaged million to 5 million US dollars per project. 44% were in the implementation stage and 22% were completed. Most of the projects were in industrial plants or infrastructure (road, etc.) The majority of projects had a range from 50-150 specific activities. The dominant project structure was functional. Most projects also tended to be longer term between 2-10 years in duration.

The findings from the descriptive statistics present some interesting patterns. The most important Manager Competencies related to the role and responsibilities of a project manager. Clearly, being in the position is not sufficient. The project manager through experience, training and development or from appropriate delegation has to understand what is required in their role and the expectations related to their performance. The ability to make decisions and understand trade offs are related competencies which can affect the project manager's performance. Members of a project team primarily need to have an appropriate technical background and communication skills, but also to apply this expertise flexibly through problem solving and trouble shooting.

The results of correlation analysis show that these independent variables of human resource competencies are all significantly correlated with the dependent variables of project performance.

These results are supportive of the findings developed from past research. They suggest the key role of the project manager, the capability and flexibility of project members.

4.4. Factor analysis of Key Human resource competencies Factor

Factor analysis was used to reduce the 11 human resource competencies variables into meaningful sub-sets of factors. Table 1 shows the results in which a two factor solution emerged. The first factor, Member Competencies, includes the competencies of project team members in problem solving, trouble shooting, commitment, team work, communication skills, and technical background. The second factor, Manager Competencies, includes the abilities of project manager to make decisions, to coordinate, to negotiate, to delegate authority, and to exercise responsibility. The two factors are described Table 1. Overall, the measures of the different constructs are clearly distinguishable from each other. This provides evidence for satisfactory discriminant validity.

The second purpose of this factor analysis is to assess the multidimensional nature of perceived project performance. The project performance criteria were operationalized as cost, time, technical performance and customer satisfaction. A factor analysis determined that project performance should be considered a unidimensional construct. This analysis shows that only one factor was extracted and specified as Project Performance. The results are presented in Table 2.

The two key human resource competencies factors had eigenvalues greater than 1, accounting 70.48% of the cumulative variance; and the project performance has an eigenvalue greater than 1, and accounting 57.82% of the variance. These match the acceptable criteria for factor analysis: an eigenvalue more than 1, at least 50% variance being explained, and simplicity of factor structure. Cronbach's alpha was used to assess the reliabilities for the three groups of key human resource competencies project factors and the project performance. The Member Competencies and Manager Competencies, had reliabilities of 0.90 and 0.91 respectively. The project performance reliability was 0.73.

Table 1. Results of Factor Analysis for the Member and Manager Competencies

	Factor 1: Member Competencies	Factor 2: Manager Competencies
Problem solving	.884	
Trouble shooting	.859	
Commitment	.737	
Teamwork	.687	
Communication skills	.673	
Technical background	.630	
Ability to make decisions		.895
Ability to coordinate		.824
Ability to negotiate		.782
Ability to delegate authority		.757
Ability to perceive role and responsibility		.691
Eigenvalues	6.579	1.174
Variance explained (%)	59.81	10.67
Cronbach alpha	0.9001	0.9128

Table 2. Results of Factor Analysis for Project Performance

	Factor 1: Project Performance
Technical performance	.828
Customer satisfaction	.712
Cost	.599
Time	.505
Eigenvalues	2.313
Variance explained (%)	57.817
Cronbach alpha	0.7283

4.5. Structural Equation Modeling Approach

In this study, a conceptual framework was developed to determine the important human resource competencies factors in project performance. The framework considered the relationships between the key factors of human resource competencies and project performance. In this conceptual framework, two factors of project manager competencies and team member competencies are considered as first order constructs; and human resource competencies are treated as higher order construct. The variables of two first order constructs and the relationships between the constructs and project performance were presented in more detail in Figure 1. These relationships were analyzed by Structural Equation Modeling (SEM) techniques with the application of the AMOS software.

The SEM results are shown in Figure 1. These results indicate that there are two factors including Manager Competencies, and Member Competencies which had a significantly positive relationship with Human Resource Competencies and finally affect to Project Performance. The model achieved a convergence with 7 iterations. The SEM model maintained GFI = 0.941, TLI = 0.971 and CFI = 0.977. All of these indices fall into the acceptable range of overall fit (greater than .90). The model RMSEA was 0.053 and Chi square was 86.13 with 52 degrees of freedom, which indicates a satisfactory fit of the model to the data. This confirmed the validation and the generalizability of the proposed constructs as well as the overall fit of the observed data.

The SEM model in Figure 1 shows that four items of performance criteria including cost, time, technical performance and customer satisfaction are significantly related to project performance at the .05 level. Technical performance (.81) has the strongest relationship to Project Performance, followed by customer satisfaction (.74), cost (.58) and time (.52). The model shows that four items consisting of the abilities of project manager to make decisions, to coordinate, to negotiate, and to delegate authority were related significantly to Manager Competencies.

Ability to coordinate (.85) has the strongest relationship, followed by the ability to make decisions (.84), ability to negotiate (.82), and ability to delegate authority (.80). Member Competencies includes problem solving, trouble shooting, commitment, and technical background. Problem solving (.92) has the strongest relationship to Member Competencies, followed by trouble shooting (.81), goal commitment (.80), and technical background (.66). The Manager Competencies and Member Competencies demonstrate a significant relationship with human resource competencies and finally affect to Project Performance.

The findings indicate that Manager Competencies exerts the highest impact on Human resource competencies (.86), followed by Member Competencies (.84). The results also indicate that a Human resource competency has high impact on Project Performance (.62). The empirical results provide statistical evidence to support the hypothesis was developed to examine the relationships in the conceptual framework.

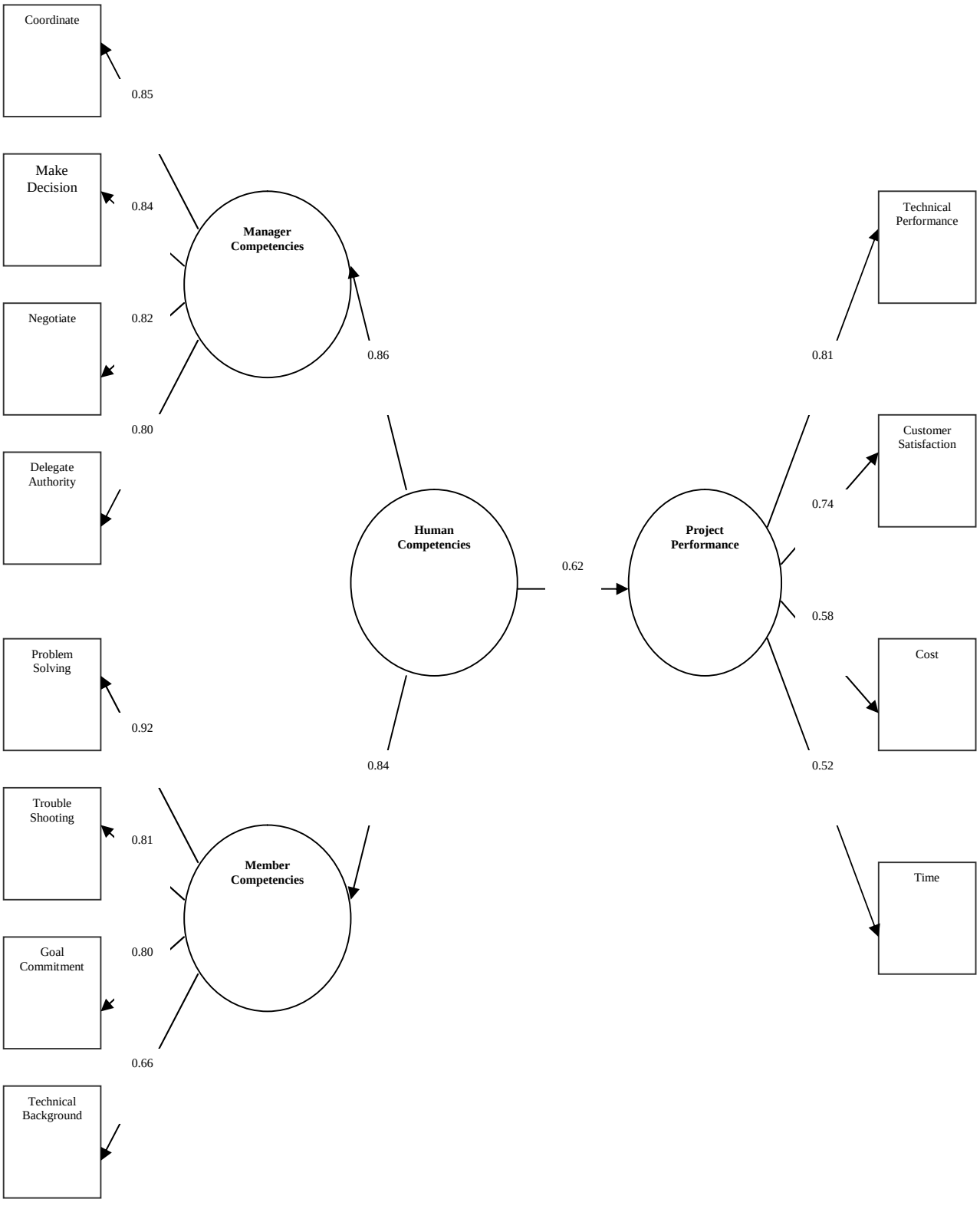
Coordinate
0.85
Make Decision
0.84
Negotiate
0.82
Delegate Authority
0.80
Manager Competencies
0.86
Problem Solving
0.92
Trouble Shooting
0.81
Goal Commitment
0.80
Technical Background
0.66
Member Competencies
Human Competencies
0.84
0.62
Project Performance
0.81
Technical Performance
0.74
Customer Satisfaction
0.58
Cost
0.52
Time

Figure 1. SEM Results of Conceptual Framework

5. CONCLUSIONS

This study examined the relationships between the key Human Resource Competencies factors and Project Performance that were developed into a conceptual framework. These relationships were analyzed by Structural Equation Modeling (SEM) techniques using AMOS. This is an application of a new statistical methodology in the field of project management. The SEM results supported the hypothesis of the relationships in the conceptual framework. The results confirmed that the factors of Manager Competencies and Member Competencies had a positive and significant relationship with Human Resource Competencies and finally impact on Project Performance. These also provide confirmatory support to the human resource competencies variables developed by Belassi and Tukel [1]. This confirmed the important role of human resource competencies in project performance that stated from management theory.

The SEM model also demonstrated that four items of performance criteria including cost, time, technical performance and customer satisfaction are significantly related to Project Performance. This finding also determined that Project Performance can be considered a unidimensional construct. The results indicated that the criteria of technical background and customer satisfaction are more important than cost and time in the evaluation of the project success. Four competencies including the abilities of project manager to make decisions, to coordinate, to negotiate, to delegate authority were significantly related to the Manager Competencies. For Member Competencies, problem solving, trouble shooting, goal commitment, and technical background were significantly related to the Member Competencies.

5.1. Implications

In the focus group, 57.1% of 21 Vietnamese professionals in infrastructure projects agreed the results of this study concerned human resource competencies will contribute to the improvement of the project management approaches in Vietnam. No one disagreed and 42.9% gave other comments. Almost participants agreed the research findings are appropriate to the infrastructure projects in public sector with small and medium scale (due to sampling). The findings contribute to improving and completing the management of project with government budget. Lesson can be drawn for public project management. In future, infrastructure investment in Vietnam will see more private participation. Research should pay additional attention to this trend.

In summary, there are significant implications of the results for practice. First, this study assessed the literature available on project management to identify human resource competencies factors and project performance, and assess infrastructure projects in Vietnam. The results of this study supported the human resource competencies factors and the project performance criteria developed in the literature review. From the results, the Vietnamese project professionals as well as their peers throughout developing countries can recognize and insure the key human resource competencies needed for better project performance. Secondly, this study demonstrated that factors related to Manager Competencies and Member Competencies that improve Project Performance. It suggests that more emphasis on developing these competencies through more appropriate training and education such as executive-level project management courses or decision making techniques for managers, and project management tools for professionals in skills and certification may be very important for the future success of projects. Appropriate training has an important part to play in enhancing individuals' preparedness and abilities to

change [19]. Also, Cheng et al. found that one of barriers to implementing new performance solutions stemmed from an absence of appropriate training interventions that enhances human resource competencies [20].

5.2. Limitations

When interpreting the results of this study, two issues have to be considered. This study was concentrated on identifying the critical project factors of human resource competencies and examining the causal effects between these factors and project performance. The use of a subjective measurement approach is problematic. The focus of this study emphasized how the project professionals working in infrastructure projects in Vietnam perceived project success and its antecedent factors. There is certainly the possibility of bias in their responses. It is very difficult to obtain an objective data of project performance or key project factors. Attitudinal measures are a better indicator of human resource competencies factors in project management. Another limitation involves the generalizability of the results because the findings of this study are based only on the sample of infrastructure projects in Vietnam.

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