

Research on the Influence of Project Manager Competence on Project Performance in Construction Enterprises

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Abstract. On the basis of theoretical analysis, the competency of project managers in construction enterprises is summarized into three characteristic dimensions: personal trait, professional ability and comprehensive management ability, and a theoretical model of the relationship between the competency of project managers in construction enterprises and job performance is constructed. The model is verified by using the data obtained from questionnaire survey and regression analysis technology. The results show that, The competence of project managers in construction enterprises has a significant predictive effect on job performance. The conclusions not only enrich the competency theory, but also provide useful enlightenment for the human resource management practice of enterprises.

Keywords: Project manager, competency, performance

1. Introduction

Enterprises are the source power of modern economic development. Promoting the growth of new enterprises and improving the performance of new start-ups are important contents of economic concern of all countries[1]. As the core of project management, the project manager of construction enterprise is related to the project performance and directly affects the operating profit of construction enterprise [2]. The uniqueness and temporality of the project determine that the requirements for the project manager are different from those for general managers. Project managers need to guide and coordinate the work of subordinates, and their competency is different from that of ordinary employees, but they need to have some unique competency characteristics.

The concept of competency, first formally described by Harvard professor David McClelland in 1973 [3], refers to the deep personal characteristics that distinguish high achievers from average achievers in a particular job, It can be motivation, traits, self-image, attitudes or values, domain knowledge, cognitive or behavioral skills -- any of the individual characteristics that can be reliably measured or counted and that significantly distinguish between outstanding and average performance.

Competency research is mainly aimed at improving the work performance of managers, but most of the current research focuses on how to determine the constituent elements of

competency, and neglects the research on the relationship between competency elements and performance [4]. This leads to some wins that have little impact on performance. The factor of competence will also be included in the competency model, thus reducing the effectiveness of the competency model. At the same time, competency is a concept related to specific situations and industries. Different industries, different enterprises and different positions have different requirements for competency. Therefore, the general competency model in practical application is unrealistic. This paper applies the competency model to construction enterprises, conducts competency analysis for project managers of construction enterprises, and analyzes the ways and degrees of influence of competency on performance.

2. Hypothesis and Summary

A large number of studies show that the connotation of project manager competence is very broad. Spencer et al. [5] divided competency into five basic traits, such as trait, motivation, self-concept, knowledge and skill. Meredith [6] believes that project managers should have six skills, including communication, organization, team building, leadership, response and professional technology. Fisher [7] proposed that project managers should possess six key abilities, namely, behavioral understanding, leadership, influence, real important behavior, conflict management ability and cultural awareness. In many literatures, most scholars focus on the analysis of the competency of project managers, while empirical studies on the competency of project managers are still scarce [8, 9]. Especially in the specific management situation, the research on how the project manager's competency characteristics affect the performance and the degree of impact is still relatively rare.

According to the research of different scholars, according to the screening principle of evaluation indicators, combined with the requirements on project managers' ability under the current economic new normal and the definition of independent variables and intervening variables in structural equations, intervening variables are variables that cannot be directly measured, while independent variables are variables that can be directly measured. In order to study the relationship between competency and various factors as well as the influence of competency on performance, after sorting out the mutual relationship between variables, this paper preliminarily believes that the key influencing factors of project manager competency and the relationship between competency and performance exist in the relationship structure shown in Figure 1.

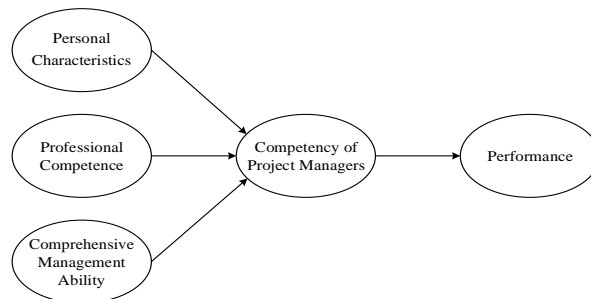


Figure 1: Main variable structure diagram

Project manager competence is mainly composed of personal characteristics, professional ability and comprehensive management ability. Therefore, the following basic assumptions are proposed:

H1a: Personal traits positively affect the competency of project managers in construction enterprises.

Personal traits are a person's relatively stable way of thinking and emotions, which can be measured internally and externally. It mainly includes anti-pressure ability, communication ability, physical quality and innovation ability, etc. Project managers with such qualities are more conducive to the development of work and the implementation of projects.

H1b: Professional ability has a positive impact on the competency of project managers in construction enterprises.

Professional ability mainly refers to the professional ability to engage in a profession, mainly including educational background, engineering practical experience and personal skills. In practical work, the project manager with richer professional knowledge background is conducive to solving practical problems in the project.

H1c: Comprehensive management ability has a positive impact on the competency of project managers in construction enterprises.

Comprehensive management ability refers to the general term of management skills and leadership of a system organization, which is fundamentally the ability to improve organizational efficiency. It mainly includes progress control ability, organization and coordination ability, quality control ability, cost control ability and risk control ability. Comprehensive management ability will directly and positively affect competency. The stronger comprehensive management ability is, the stronger competence will be.

H2: The competency of project managers in construction enterprises has a positive impact on performance.

3. Study design and data analysis

3.1. Sample selection

This study collected relevant research materials and data through the investigation of 40 construction enterprises. Since this research focuses on the competence of project managers in construction enterprises, and different personnel may have different understanding degrees of project managers' competence, the sample selection mainly focuses on personnel related to project management, including supervisors, project managers, owners' representatives and first-level construction engineers. Questionnaires were sent out by E-mail and paper questionnaires. A total of 200 questionnaires were sent out and 176 were collected, among which 152 were valid, with an effective recovery rate of 76%. The basic information of the survey sample is shown in Table 1.

The project manager competency table in construction enterprises has three characteristic dimensions, including 21 questions in total. Among them, personal traits constitute the personality characteristics of the project manager competency in construction enterprises, while

professional ability and comprehensive management ability constitute the behavioral skills of the project manager competency in construction enterprises. As the measurement of project performance is industry-specific, the project performance measurement scale of this study adopts 10 criteria for project success determined by Miiller and Turner (2007) through interviews with professionals. These indicators not only include specific performance indicators, but also evaluate the project from the perspective of stakeholders, which is a more comprehensive index evaluation system.

Table 1. Research basic information

Sample statistical characteristics	Classification	Frequency	Percentage /%
Age	20-30 years	20	13%
	31-40 years	82	54%
	41-50 years	36	24%
	More than 50 years	14	9%
Gender	Male	136	89%
	Female	16	11%
Education	Below undergraduate level	34	22%
	Undergraduate level	105	69%
	Above undergraduate level	13	9%
Management years	No longer than 5 years	45	30%
	6-10 years	83	55%
	More than 10 years	24	15%

3.2. Reliability and validity analysis

3.2.1 Reliability analysis

Reliability is the ratio of the variance of the true fraction to the variance of the observed fraction, which is used to describe the consistency and stability of the measurement tool [10]. The most commonly used tool for measuring reliability is Cronbach's alpha reliability coefficient, or α coefficient. The closer the α coefficient is to 1, the higher the internal consistency reliability is. The overall reliability of the relationship model between project manager competency and performance in construction enterprises is 0.869, greater than 0.7, and Cronbach's α value of each variable is also greater than 0.7. Therefore, it is considered that the questionnaire has good reliability and can be used for subsequent research.

3.2.2 Validity analysis

Validity is used to measure the extent to which the measurement scale reflects the true meaning of the concept in the measurement. It is not enough for the measurement scale only to have high reliability, and the measurement scale with high reliability may also be invalid, so it is necessary

to test the validity of the data. Confirmatory factor analysis of 5 variables showed that the model had a good fit. The factor loadings were all greater than 0.5, and the t-values of all indexes were also significant, indicating a good convergence validity as shown in Table 2.

Table 2. Reliability and validity test

Items	Factor loading	t	α
Personal Characteristics	0.801	8.617	0.832
Professional Competence	0.743	7.582	0.915
Comprehensive Management Ability	0.812	8.279	0.891
Competency of Project Managers	0.744	9.453	0.865
Performance	0.863	8.753	0.843

3.3. Results

3.3.1 Correlation analysis

It can be seen from the correlation coefficient among variables in Table 3 that variables of all dimensions have good correlation, indicating that subsequent regression analysis can be carried out. As can be seen from the table, there is a certain correlation between project manager competence and performance.

Table . Correlation analysis

	Personal Characteristics	Professional Competence	Comprehensive Management Ability	Competency of Project Managers	Performance
Personal Characteristics	1				
Professional Competence	0.625**	1			
Comprehensive Management Ability	0.537**	0.525**	1		
Competency of Project Managers	0.781**	0.795**	0.817**	1	
Performance	0.363**	0.371**	0.382**	0.513**	1

** . There was a significant correlation at the 0.01 level (bilateral).

3.3.2 Regression analysis

In this paper, SPSS 25.0 software was used to analyze and test the hypotheses by regression model. The regression results of the model are shown in Table 4. The results show that the personal characteristics, professional competence and comprehensive management ability of project managers in construction enterprises have a significant positive effect on the

competency ($\beta = 0.781, P < 0.01$; $\beta = 0.795, P < 0.01$, $\beta = 0.817, P < 0.01$). This shows that among project managers of construction enterprises, the stronger their comprehensive management ability, the stronger their competence. Hypothesis H1a, H1b, and H1c are supported. The competence of project managers in construction enterprises has a significant positive effect on performance ($\beta = 0.526, P < 0.01$), indicating that the project manager's competence has a significant positive effect on job performance, which supports hypothesis H2.

Table 4. Regression analysis result

	Variate	Competency of Project Managers	Performance
Independent Variable	Personal Characteristics	0.781	0.372
	Professional Competence	0.795	0.375
	Comprehensive Management Ability	0.817	0.391
Intervening Variable	Competency of Project Managers		0.526

4. Discussion

The main conclusions of this study are as follows: First, the competency of project managers in construction enterprises can be divided into three characteristic dimensions: personal trait, professional ability and comprehensive management ability. Secondly, the competency of project managers in construction enterprises is an important antecedent of job performance. Specifically, the personal characteristics, professional ability and comprehensive management ability of project managers in construction enterprises have a significant predictive effect on job performance.

5. Conclusion

On the basis of considering the uniqueness of projects in construction enterprises, this paper studies the relationship between the competency characteristics of project managers and job performance in construction enterprises, explains the influence of project managers' competency on performance and the influence path, and tries to provide reference for the selection of project managers in construction enterprises. Whether or not a project manager has competence plays a key role in the success or failure of a construction enterprise project. According to the current research, there is still a lot of research space in the research of project manager competence in construction enterprises, including the characteristics of project manager competence and the empirical research on the impact of project manager competence on performance.

The research conclusion of this paper also has certain enlightenment for the human resource management practice of construction enterprises: because the competency characteristics of project managers in construction enterprises can effectively predict job performance, and then affect the play of enterprise functions. Therefore, the three characteristic dimensions of project manager competency in construction enterprises proposed in this paper can be the basis for the selection and recruitment of project managers.

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