

Comparative Analysis of the Mechanism of Engineering Project Management Standardization

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Abstract. With the improvement of engineering project performance and the need for theoretical innovation, the importance of standardized research on engineering project management has become increasingly important. Based on the results of the questionnaire survey, and on the basis of testing the reliability and validity of the questionnaire, the hierarchical regression analysis was used to study the mechanism between the influencing factors of engineering project management standardization and process performance, cooperation performance, knowledge accumulation, and engineering project performance. And test the hypotheses. In order to further improve the effect of engineering project management, it is quite necessary to carry out research on engineering project management. However, due to the lack of a substantial amount of substantial research in the actual research process, we have mainly carried out in-depth research on engineering project management standardization.

1. Introduction

This article mainly focuses on the research on the mechanism of standardization of project management. Based on the analysis of the data collected from the questionnaire, multivariate statistical methods such as factor analysis and hierarchical regression are used to verify the previous hypotheses about the mechanism of standardization of project management. Based on the verification results, the hypothetical model is modified to clarify the mechanism of project management standardization on project performance. On this basis, according to the conclusions of the study, a coping strategy for engineering project management standardization is proposed.

From its characteristics, engineering project management is a systematic, comprehensive and complex management [1-3]. Its systematic performance is as follows: Engineering project management is an orderly integration of various methods and technologies in order to achieve specific goals, organic integration of various components of the project, and coordination of engineering subsystems to achieve the overall goal of the project the process [4]. Its comprehensive performance is: Engineering project management is a comprehensive management of interdisciplinary coordination, which requires the effective use of various resources such as personnel, funds, machinery, etc., and the management of the project management body and the project management environment. Coordinate with each other. Its complexity is manifested in the following: engineering project management is extremely complicated and requires the use of multi-disciplinary knowledge to solve the problem; at the same time, due to the long period of the engineering project, it has many unknown factors and thus causes uncertainty [5], which determines the engineering The complexity of project management is



much higher than general production management. In terms of its trends, engineering project management presents the development trend of integration, internationalization and informationization [6].

2. Application of standardized mechanism of engineering project management

2.1. Engineering project management standardization-management system

Factor variables include two forms of exploratory factor analysis and confirmatory factor analysis. Exploratory factor analysis explores the characteristics, properties, and internal correlations of a set of measurable variables, and reveals how many major potential factors may affect these original variables; confirmatory factor analysis is further determined on the basis of exploratory factor analysis. The degree to which a latent factor affects the original variable, and the degree of correlation between these latent factors. The corresponding relationship between influencing factors and their measurement indexes was verified, and exploratory factor analysis was used. The steps of factor analysis are as follows:

1. The correlation test is first performed on the measurement index, and the test is suitable for factor analysis. This article uses KMO measures and Bartlett's spherical test. In general, the closer the KMO measure is to 1, the more suitable it is for factor analysis. According to the results of the KMO measurement, there are six cases. As shown in Table 1, the corresponding judgment value can be reached before the factor analysis can be confirmed. The statistical significance of the Bartlett test should be less than 0.01.

Table 1 Principles of judging KMO statistics

KMO measure	Factor analysis suitability
0.95 or more	marvelous)
0.85 or more	meritorious
0.75 or more	middling
0.65 or more	mediocre
0.55 or more	miserable
0.55 or less	unacceptable)

2. Enter the data of each index obtained through the questionnaire in the SPSS software, use the maximum likelihood estimation method and the skew rotation method, and extract the common factor according to the method with the characteristic root greater than 1, and delete the factor load on the common factor. When the measurement index is less than 0.5, the remaining measurement indexes constitute the measurement item of the factor.

2.2. Reliability and validity analysis

According to the same or different measurement tools and measurement time, questionnaire reliability estimation methods can be divided into four types: internal consistency reliability, replica reliability, retest reliability, and scorer reliability. Intrinsic consistency reliability refers to whether each scale (measurement index) measures a single concept and pays attention to the difference in results brought by different test indicators, that is, how is the internal consistency between the items that make up the scale. The test of intrinsic consistency reliability usually uses the Cronbach's α coefficient. The larger is the value of α , the higher the internal consistency of the calculated factors. Based on the opinions of most scholars, if the calculation result of the coefficient is above 0.9, the reliability is considered to be excellent; if the coefficient result is above 0.8, it is acceptable; if the coefficient result is above 0.7, the scale should be revised, but it is still its value; the reliability coefficient is lower than 0.6, the scale should be revised or rewritten. In addition, this study also used the modified total correlation coefficient, which represents the correlation coefficient between each item and the remaining items to screen the measurement items.

The reliability analysis results of the standardization of the engineering project management process are shown in Table 2.

Table 2 CITC and reliability analysis of engineering project management process standardization

	Initial CITC	A coefficient after removing the item	a coefficient
MPS1	.759	.787	Initial a coefficient: .929
MPS2	.826	.782	Final a coefficient: .928
MPS3	.682	.829	
MPS4	.573	.872	
MPSS	.716	.787	

2.3. Validity analysis

Validity analysis mainly refers to the degree to which the measurement results can truly reflect the characteristics of the measurement object, and refers to the accuracy of the measurement results. The higher the validity coefficient, the more able to measure the traits that a test wants to measure. There are three different modes of validity evaluation: content validity from the content and scope of the measurement; correlation effectiveness of the effectiveness standard developed from the evaluation model formulated in the external standard time; emphasis on the conceptual meaning and clear construction effectiveness Degree. According to the needs of the research, this study mainly uses factor analysis to test the validity of the scale to ensure the degree of measurement of the concept by the measurement index.

First, the samples were judged for suitability, and the KMO measure and Bartlett's spherical test were used as the basis. The test results are shown in Table 3. It can be seen that both the KMO measurement and the Bartlett spherical test meet the requirements. The EFA analysis results are shown in Table 3, which shows that there is construction validity.

Table 3 Engineering project management tool standardization EFA results

Measure index	Factor
MMS1	.935
MMS2	.957
MMS3	.949
Characteristic root	2.659
Cumulative variance contribution rate (%)	88.289
KMO	.767
Bent spherical test chi-square value	551.966
Significance level	0.000

3. Case Analysis

The AA expressway is planned to be constructed using Chinese highway engineering technical standards and specifications, and a two-way, six-lane highway standard. The design speed is 120km / h, 100km / h, and the subgrade width is 31.0m.

With cooperation performance as the dependent variable, standardization of project management terminology, standardization of engineering project management process, standardization of engineering project management tools, standardization of engineering project management organization, standardization of engineering project leadership, standardization of engineering project cooperation model, standardization of engineering project information management, engineering project Performance evaluation was standardized as independent variables, and regression was performed using the hierarchical regression method. The calculation results are shown in Table 4.

Table 4 Parameter table of regression models with constant terms

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.708	.517	.516	.4006	
2	.742	.554	.544	.3853	
3	.763	.586	.576	.3778	
4	.798	.633	.628	.3564	
5	.813	.655	.644	.3463	1.776

Based on the results of the above hypothesis test, the original hypothesis model is modified, and it is concluded that the mechanism of standardized project management in the case of inconsistent project types is shown in Figure 1.

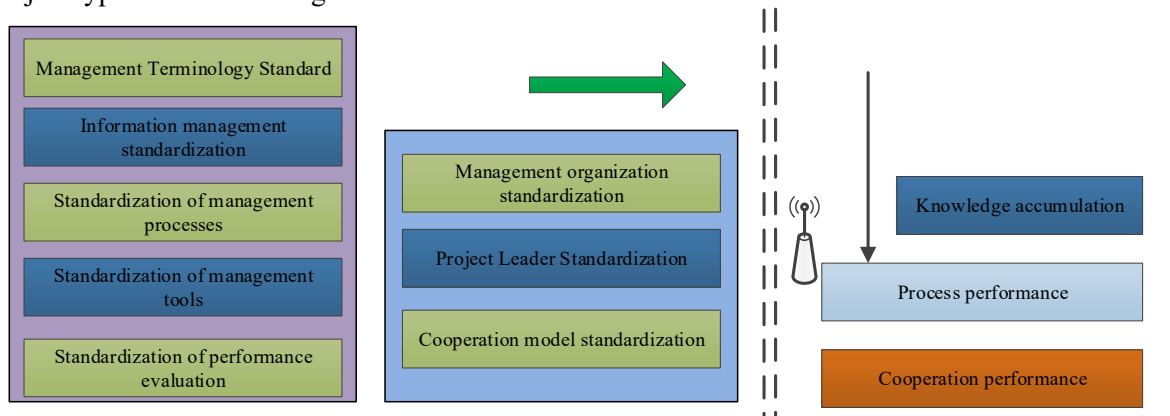


Figure 1 Standardization mechanism of project management (inconsistent project types)

As shown in Figure 1, in response to the question "how does project management standardization affect engineering project performance", this study uses cooperation performance, process performance, and knowledge accumulation as intermediate variables to explain the mechanism of engineering project management standardization. The results of hierarchical regression analysis show that cooperation performance, process performance, and knowledge accumulation are positively related to project performance as intermediate variables, and at the same time, intermediate variables such as project management standardization and cooperation performance are positively related, that is, project management standardization affects variables such as cooperation performance. Have an impact on engineering project performance. This conclusion supports the hypotheses proposed in this study and explains the mechanism of engineering project management standardization.

4. Conclusion

In summary, in engineering project management, whether the management is effective directly affects the performance of the engineering project. After the assumption and analysis of the standardized mechanism of the engineering project management, it is learned that the standardization between the engineering project management and the engineering project performance there is a direct relationship. That is, the higher the standardization of project management, the better the project performance. This fully illustrates the importance of standardized management in the implementation of engineering project management.

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