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Identifying and Investigating Usage Barriers of Agile Project Management in Road Construction Projects

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ABSTRACT: In order to complete the project on time and to accurately advance the construction and operation plans, the use of agile project management methodology in road construction projects, as the main communication networks, is essential. In this regard, the present study aims to investigate the barriers and ways of using the agility management project in road construction projects. The population consists of all project managers, specialists, experts, consultants and contractors of road and urban planning department of Isfahan province who are 150 persons. Nomber of 108 persons are selected as the statistical samples by the Cochran sample size formula and convenience sampling. The used questionnaire is a researcher-made questionnaire of agile project management obstacles, which is compiled by the following 6 dimensions (managerial-organizational, skill and competence, knowledge management, human resources, cost, project complexity) and 30 items based on the 5-point Likert scale. The face, content and construct validity of the questionnaires are confirmed. The reliability coefficient of the questionnaire is estimated (0.891). The findings of the research indicate that the number of obstacles identified in the use of agile project management in road construction projects are in the higher level than mean and the studied factors are identified as relatively strong barriers of using agile project management in road construction projects. In addition, ranking of identified obstacles as barriers of using agile project management in road construction projects is as following: knowledge management dimension with the mean rank of (4.02) if the first, human resources dimension with the mean rank of (3.69) is the second, the project complexity with the mean rank of (3.50) is the third, the managerial-organizational dimension and the cost with the mean rank of (3.37) is the fourth, and the skill and competence dimension with the mean rank of (3.06) is the fifth rank. Finally, some strategies are presented to solve the problems of using agile project management.

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1. INTRODUCTION

Because of the significant growth of road construction projects in recent years and specific economic and operational conditions of the country as well as the projects which are not optimal, it is found that the main factors of projects failure from project management perspective are the mistake in designing the goals of the processes, and neglecting the management of the problematic factors and the traditional and experimental management of the project and neglect of the agile management of the project [1]. Therefore, it is necessary that project managers change the traditional project management to agile project management, due to the complex nature of road construction projects and they use more this type of management as a characteristic for achieving success in the project. According to what is stated, the present study seeks to answer the following questions: 1) what are the obstacles of using agile project management in road construction projects? 2) What is the significance level of each identified obstacles? 3) What is the interrelation between the obstacles of using agile project management in road construction projects? 4) What are the solutions to remove obstacles in implementing agile project management in road construction projects?

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2. METHODOLOGY

The present study is descriptive based on its nature and it is an applied research type based on its purpose. The population consists of project managers, project managers, specialists, experts, consultants and contractors of road construction projects of road and urban planning department of Isfahan province who are 150 persons. 108 persons were selected as the statistical samples by the Cochran sample size formula and convenience sampling. And the same number i.e. 108 questionnaires was distributed that 100 questionnaires were returned. In order to collect data, a researcher-made questionnaire was used that was compiled using literature research and interview with 10 experts. The questionnaire included 6 dimensions (managerial-organizational, skill and competence, knowledge management, human resources, cost, project complexity) and 30 items were compiled based on the

Table 1. Single-sample t-test results for barriers in using agile project management

Dimensions	N	M	Standard deviation	Test Value=3			Lower Limit	Upper limit
				t	df	p-value		
managerial-organizational	100	3/795	0/500	15/894	99	0/0	0/695	0/894
skill and competence	100	3/707	0/653	10/829	99	0/0	0/577	0/837
knowledge management	100	3/955	0/693	13/780	99	0/0	0/817	1/092
human resources	100	3/853	0/527	16/186	99	0/0	0/748	0/957
Cost	100	3/776	0/601	12/908	99	0/0	0/656	0/895
project complexity	100	3/804	0/585	13/735	99	0/0	0/688	0/920

Table 2. Friedman test results (significant result)

x2	Degree of freedom	Significant level	Test result
15.690	5	0.008	H0 is rejected

Table 3. Friedman test results (mean rank of barriers in using agile project management)

Row	Indicator	Mean rank	Rank
1	managerial-organizational	3.37	3
2	skill and competence	3.06	5
3	knowledge management	4.02	1
4	human resources	3.69	4
5	Cost	3.37	3
6	project complexity	3.50	2

5-degree Likert scale. The face validity and content validity were confirmed too. Also, factor analysis is used to determine the construct validity of the questionnaire. The reliability coefficient of the questionnaire was estimated as (0.891). Data analysis was done using SPSS software.

3. 3. Findings

3-1. What are the obstacles of using agile project management in road construction projects?

According to Table 1, the P-value is smaller than 0.05; therefore, the identified obstacles in the proposed dimensions are significantly different from the test value (i.e. number of 3). On the other hand, according to this fact that the obtained upper and lower limits of the confidence interval are positive, it can be concluded that the amount of identified obstacles of using agile project management in road construction projects is more than the average and the studied factors are relatively strong as obstacles of using agile project management in road construction projects.

3-2. What is the significance level of each identified obstacles?

The results of Table 2 show that the significance level is less than the threshold of 0.05 (P<0.05); thus, there is a significant difference between dimensions (managerial-organizational, skill and competence, knowledge management, human resources, cost and project complexity) in identified obstacles for using agile project management.

Based on the results of Table 3, Friedman test rankings, knowledge management dimension with the mean rank of (4.2) is the first rank, human resources dimension with the mean rank of (3.69) is the second one, project complexity dimension with the mean rank of (50/3) is the third one, organizational-managerial dimension and cost with the mean rank of (3.37) is the fourth one, and skill and competence dimension with the mean rank of (0.63) is the fifth rank.

3-3. What is the interrelation between the obstacles of using agile project management in road construction projects?

3-4. What are the solutions to remove obstacles in implementing agile project management in road construction projects?

In the present study, 30 obstacles were identified and some of them were referred in Table 5 in the following in order to remove them.

Table 4. Interrelationships between barriers in implementing agile project management

Pearson correlation coefficient	Management of organization	Skill and competency	Knowledge management	Human resources	Cost	Project complexity
Management of organization	1	0/466**	0/260**	0/631**	0/413**	0/464**
Significance level		0/000	0/009	0/000	0/000	0/000
Skill and competency		1	0/244*	0/538**	0/471**	0/465**
Significance level			0/014	0/000	0/000	0/000
Knowledge management			1	0/392**	0/380**	0/275**
Significance level				0/000	0/000	0/006
Human resources				1	0/518**	0/537**
Significance level					0/000	0/000
Cost					1	0/704**
Significance level						0/000
Project complexity						1

**P<0.01

*P<0.05

Table 5. Proposed solutions to remove the barriers in using agile project management

Row	Dimension	Identified obstacle in using agile project management	Solution
1	managerial-organizational	Lack of the culture of using new technologies and methods of project management in the construction industry.	Cultural development and education combined with the use of new technology in the form of seminars, training courses, books and standards of cultural skill education.
2	skill and competence	Being multifunctional can damage employee's productivity.	Division of labor, elimination of parallel activities, specialist-oriented, and the centralization of all activities.
3	knowledge management	Lack of knowledge on agile project management among decision-makers of construction companies.	Attention and focus on the subject of documentation, knowledge management and learning from the experiences of the organization projects.
4	human resources	Groups with more voluntary lead to change the treaty provisions.	The project manager will activate ultimate talent and staffing capacity to generate value for the project and smooth possible obstacles. In addition, the manager trusts and respects the personnel's capacity and knowledge to properly perform the assigned duties.
5	Cost	High salary costs for people with different specializations.	Adjustment of power and cost management through the design of appropriate payroll systems.
6	project complexity	The complexities of the transfer from the classical style to the agile way is high in managing road construction projects.	The application of scientific management can be useful in this regard. The recruitment of scientific directors with a good scientific and practical background as well as consulting with them can be considered as an appropriate solution in this regard.

4. DISCUSSION AND CONCLUSION

ccording to this fact that road construction projects are inherently uncertain and that they are facing many changes along their way, it is necessary be used the agile project management solution in order to improve the efficiency of these projects. Agile project management is one of the latest methods or project management philosophies that simply balances flexibility and stability and it aims is continuous improvement and growth.

4. REFERENCES

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