



INFLUENCE OF PROJECT MANAGEMENT MATURITY ON PROJECTS' COSTS

Dr. Seweryn Spalek, Silesian University of Technology, Poland
spalek@polsl.pl

ABSTRACT

Purpose: *The purpose of this paper is to demonstrate the link between reaching a certain level of Project Management Maturity by the company and its projects cost performance.*

Design/methodology/approach: *The world-wide study was conducted in order to measure the influence of the Project Management Maturity level on the cost of projects. The survey was questionnaire based. As a result 194 cases were analyzed.*

Findings: *We found that an increasing level of maturity in Project Management can have an influence on the reduction of costs of projects managed by the company. However, the strength of this influence depends on various factors which are discussed in the paper.*

Research limitations/implications: *Research limitations are mostly connected with a limited range of industries available. Thus, limited representation led to a restricted cross-comparative study.*

Practical implications: *Companies assess their maturity levels in Project Management. The findings of this paper demonstrate to them the potential benefits they can gain by increasing their maturity level.*

Originality/value: *There is a limited number of world-wide studies on Project Management Maturity in companies. Moreover, the studies examining the influence of a certain maturity level on projects' key performance indicators are limited to single case studies. Therefore, the paper fills an important gap of knowledge in that area.*

Keywords: Project Management, Maturity, PMM, Costs, Influence, Company.

Classification: Research paper

INTRODUCTION

Projects are run by an increasing number of companies. Moreover, the number of projects run by companies has increased as well. Such a situation creates many multi-project environments, thus (Spalek, 2012) the management of them is a complex issue. Therefore, companies try to estimate how good they are at managing their projects (Liang, Liu, Lin, & Lin, 2007) (Tarn, Yen, & Beaumont, 2002). They perform maturity assessments in the field of Project Management (Becker, Knackstedt, & Poppelbuss, 2009; Grant & Pennypacker, 2006; Tervonen, Alapiha, & Haapasalo, 2009). The results of such assessments lead them to potential room for improvement and, as a result, gain a higher level of maturity. However, the question arises whether the improvement in maturity reflects in an improvement in a project's outcomes? If so, to what extent? In this article, we try to answer that question and fill in the gap of knowledge in that particular area.

THE ISSUE OF THE INFLUENCE OF ORGANIZATIONAL MATURITY ON PROJECTS' OUTCOMES

There are a number of models that could be used to assess maturity in Project Management in a company. Hillson (2003) argues that the number of practically implemented models could be over forty. Among them we can distinguish (Khoshgoftar & Osman, 2009) OPM3, CMMI (Twaites, Collofello, & Zenzen, 2004) (Twaites, Collofello, & Zenzen, 2004) (Twaites, Collofello, & Zenzen, 2004) (Twaites, Collofello, & Zenzen, 2004), P3M3 (Manzil & Javed, 2007), PRINCE (Zhang, He, & Zhang, 2012), BPMM (J. Y. Lee, Lee, & Kang, 2007), and Kerzner's Project Management Maturity Model. However, there is a very limited body of research conducted in the area as to whether the improvement in maturity reflects in an improvement in companies' operations (Liu, Chen, Chan, & Lie, 2008; Wang, 2008). Furthermore, the impact on the project's outcomes is investigated in single case studies in the chosen aspects of managing projects (Belt, Oiva-Kess, Harkonen, Mottonen, & Kess, 2009; Jiang, Klein, & Pick, 2003; Lee, Lin, & Pai, 2005). There is a significant gap in research on the correlation between Project Management maturity and projects' outcomes. The reason for this situation could be that (1) it is hard to determine the impact as the issue is multidimensional and (2) the commonly used Project Management Maturity models are adequate for the assessment of maturity in a case-studies approach, while in comparative studies they are hard to apply.

Therefore, in this article we try to advance the current state of knowledge by investigating the influence of Project Management Maturity on projects' costs.

RESEARCH DESIGN

This research was part of a wider international study sponsored by the *National Science Center*, whose purpose was to investigate Project Management Maturity in the chosen companies and its implications. In order to perform the comparative study among the companies, we built a maturity model which was used in the assessments (from level 1-the lowest, to 5-the highest) in a number of companies, mainly from the machinery industry. The study was questionnaire-based and was performed both online and also by using a traditional approach. The research instrument was validated by experts in the field. As a result, 447 samples were gathered, representing companies from a variety of countries. Among those companies, the ones reporting a maturity level of at least 2 were chosen. Their experts responded to the questions regarding the potential impact of maturity in Project Management on projects' outcomes. In this article, we will focus on the issue of cost only. The number of validated and analyzed data samples for that purpose is 194. Cronbach's Alpha tests confirmed the reliability of data reporting values over 0.97.

The respondents were to choose the impact of change in the maturity level on forthcoming projects in terms of cost. They ought to consider the change in maturity in the following areas: (1) Human Resources, (2) Methods, (3) Environment and (4) Knowledge Management. Furthermore, they were supposed to estimate the potential impact of the change in maturity in each area by one level up on forthcoming projects. The level of impact was described as follows; 1: No influence, 2: 1-10%, 3: 11-20%, 4: 21-30%, 5: over 30% on projects' costs reduction. The change in maturity was considered to be one of the following types: from 1 to 2 (1-2), from 2 to 3 (2-3), from 3 to 4 (3-4) and from 4 to 5 (4-5). The scale of maturity

levels was formed based on the framework proposed in the wider context of overall studies and is described as follows: LEVEL 1 - *Initial*, LEVEL 2 - *Standardized*, LEVEL 3 - *Appliance*, LEVEL 4 - *System Management*, LEVEL 5 - *Self-improvement*. The scheme of measuring impact is shown in figure 1.

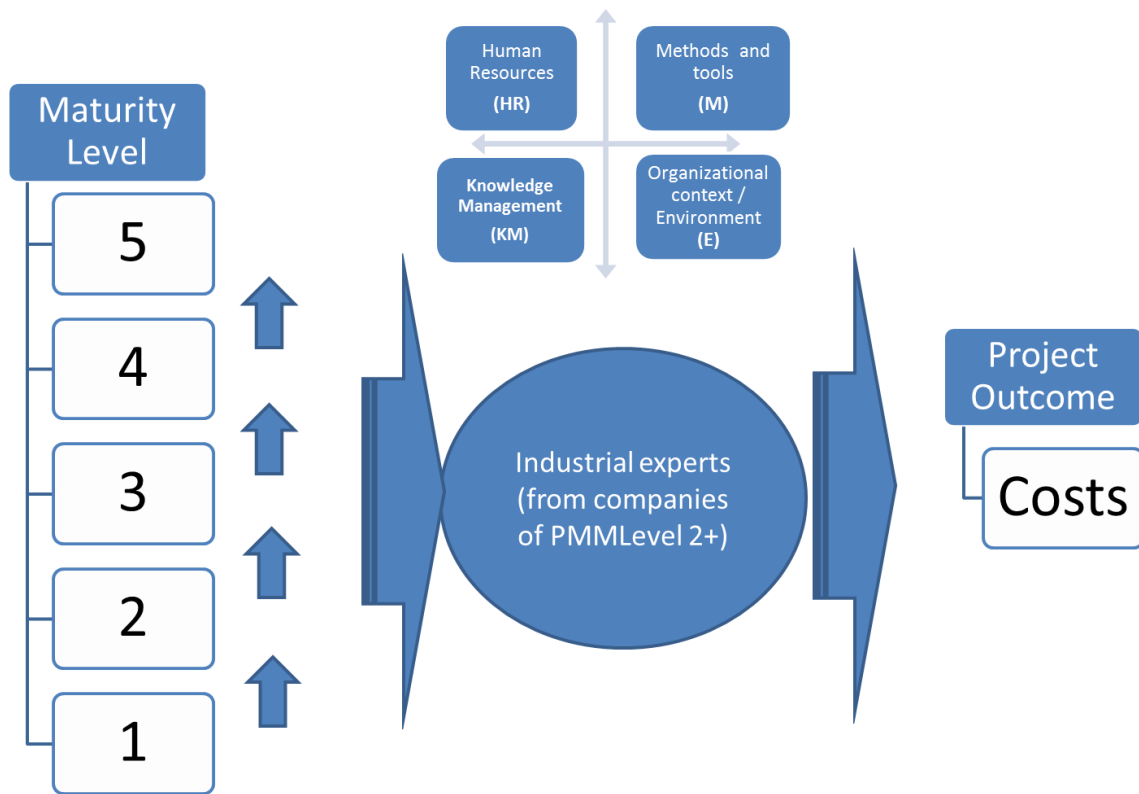


Figure 1. The scheme of measuring the impact of change in maturity on the project costs

RESULTS AND DISCUSSION

The companies chosen to be investigated in the paper were from a broad range of countries (N=19). Among them, most companies (80,2%) were located in: Germany, Denmark, USA, Sweden, Switzerland, Italy and Finland. Some companies came from: Austria, France, UK, India, Iran, Japan, Australia, Morocco, Russia, Slovenia, Slovakia and Lithuania. They represented three types of industries: Machinery Industry (IND), Information Technology (IT) and Construction (CONS). Moreover, in our work, we focused on each of those groups separately according to the impact of Project Management maturity on the projects' costs. Furthermore, we conducted cross-industrial studies in each of the investigated maturity areas: (1) Human Resources, (2) Methods, (3) Environment and (4) Knowledge Management.

The construction branch (CONS) reported some influence of changing the maturity level up on the projects' outcome. However, the level of influence depended on the change type (1-2, 2-3, 3-4, 4-5). The highest average impact (3.6) was noticed in the changes in maturity of types 1-2 and 2-3 in the area of Human Resources (HR). It then decreased to 2.85 and 2.10 for types 3-4 and 4-5 respectively.



In the area of Methods (M), the impact reported the same level of 3.6 for change types of 1-2 and 3-4. It then also decreased to level 2.85 and 2.10 for types 3-4 and 4-5 accordingly. In the Environment (E) and Knowledge Management (KM) areas, the results were the same and, for types 1-2 and 2-3, the impact on projects' costs was 2.85 and further declined to 2.10 (3-4), finally settling at level 1.5 (4-5).

The machinery industry branch (IND) reported slightly lower influences. However, a downward trend was also observed in all areas of maturity (HR, M, E and KM).

The average impact of 3.46 was noticed for maturity change type 1-2 and 2-3 in the Human Resources area (HR). An impact level of 2.74 and 2.02 was reported for change type of 3-4 and 4-5 respectively. In the methods area (M), the results were the same as for the Human Resources area.

Furthermore, in the areas of Environment (E) and Knowledge Management (KM), reported influences were at the same level. Furthermore, they showed an average value of 2.74 for 1-2 and 2-3 types of changes and, for 3-4 and 4-5, it decreased respectively from 2.02 to 1.46.

The Information Technology (IT) branch reported a different structure of influences than in the above-stated Machinery Industry (IND) and Construction (CONS). As opposed to IND and CONS, there were no significant differences in impacts between the four areas in IT. However, the impact level also reported a downward trend over the types of maturity changes. For the change types of 1-2 and 2-3, the average impact was 3.62 in Human Resources and (HR) and Methods (M), while, in Environment (E) and Knowledge Management (KM), it was 3.59. For 3-4 and 4-5, the impact decreased to 2.87 and 2.13 in the Human Resources and (HR) and Methods (M) areas while, in Environment (E) and Knowledge Management (KM), it declined to 2.85 and 2.13 respectively.

The cumulative data chart of the average influences of the changes resulting from one level up in maturity, in specific areas, on project costs is shown in table 1.

Table 1. The average influences of the change in maturity on project costs; (HR) Human Resources, (M) Methods, (E) Environment, (KM) Knowledge Management.

Group Statistics						
BRANCH	Maturity change	N	HR	M	E	KM
CONS	1-2	48	3.6	3.6	2.85	2.85
	2-3	48	3.6	3.6	2.85	2.85
	3-4	48	2.85	2.85	2.1	2.1
	4-5	48	2.1	2.1	1.5	1.5
			HR	M	E	KM
IND	1-2	107	3.46	3.46	2.74	2.74
	2-3	107	3.46	3.46	2.74	2.74
	3-4	107	2.74	2.74	2.02	2.02
	4-5	107	2.02	2.02	1.46	1.46
			HR	M	E	KM
IT	1-2	39	3.62	3.62	3.59	3.59
	2-3	39	3.62	3.62	3.59	3.59
	3-4	39	2.87	2.87	2.85	2.85
	4-5	39	2.13	2.13	2.13	2.13

The main purpose of this article was to investigate potential influences of Project Management Maturity change on the projects' costs. We pointed out some dependencies in relation to: (1) branch, (2) area of maturity and (3) type of maturity change. That was, we believe, the first step toward the more advanced data analysis, including factor analysis, in order to determine the correlations between the specific factors and recognize their groups.

CONCLUSIONS

The issues discussed in this paper were to answer the research question whether an improvement in maturity reflects in an improvement in projects' outcomes. The presented results of the research showed that an influence on costs (one of the project outcomes) exists. However, we recognized that the influence varies: (1) among the industries, (2) in specific maturity areas and (3) in relation to the type of maturity change.

We discovered some similarities between the Construction and Machinery industries. Their results were alike regarding (1) level of influence in specific maturity areas (Human Resources, Methods, Environment and Knowledge Management) and (2) level of influence caused by different types of change of maturity (from level 1 to level 2 (1-2), from level 2 to level 3 (2-3), from level 3 to level 4 (3-4) and from level 4 to level 5 (4-5)). Both branches reported similar influence levels in the Human Resources & Methods areas and Environment & Knowledge Management areas.

While the Information Technology industry reported only the influence caused by different types of change of maturity. There were no significant differences in the influence in specific maturity areas.

It is remarkable that all branches reported a drop in influence with the type of change in maturity. The biggest influence was always reported for the maturity change 1-2 and 2-3 and then it decreased through 3-4 to 4-5, irrespective of the specific maturity area. This observation leads to the conclusion that the efforts in increasing maturity levels from *initial* to *standardized*, and from *standardized* to *appliance*, is of the highest potential average impact on the projects' costs reduction (up to 30%). Further efforts to improve maturity from *appliance* to *system management* and from *system management* to *self-improvement* result in a lower average potential impact on costs reduction (up to 20%).

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