

Title	A Different Dimensions' Success and a Different Management Control View
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Citation	大阪大学経済学. 59(4) P.50-P.62
Issue Date	2010-03
Text Version	publisher
URL	https://doi.org/10.18910/27157
DOI	10.18910/27157
rights	
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A different dimensions' success and a different management control view*

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Abstract

A different dimensions' success is relevant to a different management control view (Shenhar et al. 2001). It indicates that each different management level has different success dimensions, and each level needs to have different success measures. Therefore, organizations should manage different management level differently according to the management environment. This study deals with different management levels using two different concepts; program and project. The purpose of this research is to identify the nature of program management, and also, to ultimately present a perspective to build the framework of Program & Project MCS (Management Control System). For research purposes, here in this paper, I empirically examine the relation between single-project (New Product Development project) management and program management with the aspect of organization's management ability. The data from 104 manufacturing industries in Japan were analyzed. The results show that program management efficiency is a significant element for single-project performance. Moreover, the findings indicate that there are different dynamic factors that enhance each program performance and project performance.

JEL classification numbers: M10, M11

Keywords: management control system, program management, project management, new product development

1. Introduction

The management control system (MCS) literature provides some illustrations of the relation between management and performance, considering short-term profits (budget, cost, quality and delivery time) and long-term benefits (organizational success and preparing for the future). However, despite the relatively increasing concerns on program and project, there is little empirical research examining the gaps existing between the projects MCS for managing a single-project itself and program MCS for managing each individual project in a coordinated way. Also, there is little empirical research exploring the mechanisms of project-program relation as value creation processes.

* The author would like to thank Professor Takayuki Asada from the Graduate School of Economics, Osaka University for his kind comments and suggestions. The author takes responsibility for any remaining errors.

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With such a meaning, the main concern of the study is to present a new perspective on programs and projects as value creation processes. This paper empirically examines the relationships between program management and a single-project management. More specifically, I review the existing gaps by investigating whether each factor of the different level MCS enhances each performance (program and project).

This paper contributes in the following respects. First, it is in observing the dynamics of the relationship between programs and projects as value creation processes. The second contribution of this study is in presenting a chance to build a MCS framework which is more efficient and effective with program / project management perspectives.

The rest of the paper is organized as follows. The next section outlines the literature review and hypotheses. The third section presents the research method and measurement of the variables. The results are reported in the fourth. Finally, the fifth section discusses and concludes the research.

2. Literature review and Hypotheses

2.1. Prior literature

In recent years, studies focusing on the conceptual definitions of program/project and program management/project management have been performed by several researchers (Pellegrinelli, S. 1997; Thiry 2002; Lycett et al. 2004; Maylor et al. 2006; Mark and Tony 2008). In these studies, Pellegrinelli (1997) has made a distinction between program configurations (project, portfolio, goal-oriented, and heartbeat). He (1997) defines a “program” as a framework for grouping existing or new projects, and for focusing all the activities required to achieve a set of major benefits. He also points out that:

“These (grouping) projects are managed in a coordinated way, either to achieve a common goal, or to extract benefits which would otherwise not be realized if they were managed independently.”

According to the Project & Program management (P2M) standard guidebook (2001), the “program” is defined as the term that plural projects are connected to each other organically to realize a general mission of organizations. Also, P2M defines the term “project” as a detailed means and activity to realize organizational program goals. And Thiry (2002) noted that programs usually covering a group of projects, must be coordinated, and create a synergy, which will lead to greater benefits that projects could do individually. Most of program researchers emphasize that program to realize a common goal of organizations needs MCS built with various, comprehensive view points and recognize that the MCS also needs to keep the balance controlling each project in the program for realization its goal.

According to the perspective of program management lifecycle (Pellegrinelli, S. 1997; Lycett, et al. 2004), a program is firstly identified and planned as a long-term activity. Then, projects to attain specific outcomes are delivered during the program execution stage. Lastly, on the basis of the results achieved or on a periodic basis, the management then can close the program. In order to maximize program performance, the program is controlled and managed with efficiency and effectiveness of not

only each single project but also plural projects delivered during the program execution stage.

In such a case, however, it seems reasonable to suppose that conceptual gaps are always present between program MCS and project MCS. That's because objects that are managed and controlled, as well as surrounding environments, and goals of program and projects are different. Moreover, while some degree of flexibility is an essential ingredient to productive NPD (New Products Development), upper-management¹ is faced with the challenge of instituting efficient and effective control mechanisms which lead projects in the right strategic direction, monitor progress toward organizational and project goals, and allow for adjustments in the project if necessary (Joseph et al. 2002). As Joseph et al. (2002) put it, too much or the wrong type of control may constrain the project team's creativity, interfere with their progress, and spoil their ultimate performance.

A different dimensions' success is relevant to a different management control view. Organizations should manage different management level differently according to the management environment. However, there are some limitations about explanations of which organizational MCS factors enhance program performance and project performance, respectively. This paper aims at, firstly, clarifying how MCS factors of organizations influence program and project performance, and, secondly, at contributing to construction of MCS which takes program and project into account together, fitting in a policy and a strategy of organizations.

2.2. Hypotheses

For the study purposes and questions, the following simple hypotheses are formalized. Fig.1 illustrates the relationship between the following hypotheses (it shows simple relations but using difficult concepts). Organizations' management maturity including project practical factors and its support factors affect the efficiency of program management and program performance. If organizations' management elements maturity increases, management efficiency and performance of a single-project will enhance. Therefore, the hypotheses are as follows:

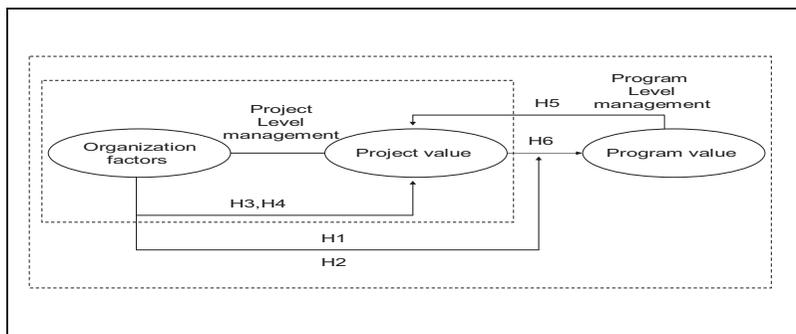


Fig. 1. Summary of research questions

¹ The term of program managers in our study indicates this level of upper-Management

- H1: The management elements maturity of organizations has a positive relation with efficiency of the program management.
- H2: The management elements maturity of organizations has a positive relation with the performance of program.
- H3: The management elements maturity of organizations has a positive relation with the individual project efficiency.
- H4: The management elements maturity of organizations has a positive relation with the individual project performance.

Furthermore, it is conceptually rational that program management has an influence on the single-project performance. That's because it efficiently coordinates specified plural projects delivered for program realization. And it is thought that when a single-project performance improves the program performance increases. Therefore the next hypotheses are as follows:

- H5: The efficient management for the projects by program management will lead to enhanced single-project performance of organizations.
- H6: When the performance of products development project increases, the program performance will enhance.

3. Analysis method

3.1. Method

To test the hypotheses I collected data through mailed questionnaire-based survey. The survey was pilot tested by academic colleagues, members of P2M, before the mailing of the questionnaire. I mailed questionnaires to 969 manufacturing industry companies of the TSEM (Tokyo Stock Exchange Market) First Section presentation in Japan. Data were collected from 116 (response rate 12%, final sample 103, 10.6%) managers who took a central role in products development / service development, and I asked for the answers such as project plans and results by concerning the average in the past 3 years. The demographic data are given in Table 1 and Table 2. The data showed no significant bias from industry compositional point of view.

3.2. Variables

The following variables were used to measure the organizations' management maturity, program management efficiency, program management performance, NPD project management efficiency and NPD project performance. Each is discussed in turn.

3.2.1. Management maturity

The questionnaire items related to the organizations' management maturity were based on Shibao (2006). As Shibao used in his study, I divide the organizations' management maturity into

Table 1. Demographic data relating to the sample

<i>Sample industry composition</i>									
	Sample		Replying firms			Sample		Replying firms	
	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>		<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>
Construction	115	11.9	8	7.77	Steel	34	3.5	6	5.83
Food	76	7.9	10	9.71	Metal	56	5.8	7	6.80
Paper	13	1.3	2	1.94	Machine	118	12.2	12	11.65
Chemical	114	11.8	9	8.74	Electronics	159	16.4	14	13.59
Medicine	36	3.7	5	4.85	Precision Equipment	23	2.4	1	0.97
Textiles	47	4.9	4	3.88	Transport equipment	57	5.9	11	10.68
Rubber	10	1.0	1	0.97	Other	55	5.6	9	8.74
Power	26	2.7	0	0					
Ceramics	29	3.0	4	3.88	Total	968	100	103	100

Table 2.

	Number	%
Number of employees		
Less than 999	15	14.4%
1000 – 1999	26	25.0%
2000 – 4999	29	27.9%
5000 – 10000	14	13.5%
More than 10000	19	18.3%
Position of work		
Program manager	23	22.1%
Project manager	80	76.9%
Type of organization		
Functional organization	65	62.5%
Matrix organization	26	25.0%
Project organization	10	9.6%
Others	2	1.9%
Projects type		
Product development	76	73.1%
Others	27	26.0%

environmental management elements (i.e. program level management elements) and practical management elements (i.e. project level management elements)². Each item to estimate the degree of organizations’ management maturity was measured by a five-point Likert-type scale, ranging from 1 (not applicable) to 5 (very applicable), and principal components analysis was used. Reliability was estimated by Cronbach’s alpha.

About the environmental management elements, the following items were investigated. Strategy management (4 items; e.g. For achievement of company vision, a concrete strategy is practiced); Process management (3 items; e.g. Project management process is unified and defined through all phases of product life cycle including sales); Organization management (3 items; e.g. There is a process to relax conflict between sections for project); Appraisal management (3 items; e.g. There

² In this study, I used the concept of “environmental management elements” as the same meaning of “program level management elements”, and “practical management elements” as the same meaning of “project level management elements”.

is the process evaluating the member of project individually); Organizational culture management (4 items; e.g. Management-style is open and becomes coordinate).

The following items for practical management elements were used. Scope management (6 items; e.g. There is a process to subdivide a project scope, and to make it clear); Time management (3 items; e.g. Process to draft a schedule is refined); Cost management (3 items; e.g. R&D cost is grasped, and it is integrated with management accounting, systematically); Quality management (3 items; e.g. A quality review process is carried out adequately); Human Resources management (3 items; e.g. There is a process to make a role of project members, and responsibility clear); Communications management (5 items; e.g. An offer of a place realizing joint ownership of problems and interchange of knowledge in a project team is performed); Risk management (2 items; e.g. There is a process to specify a risk and evaluate it, and to support it); Procurement management (3 items; e.g. There is a supply choice process, and it is evaluated, and supply is chosen systematically); Integration management (4 items; e.g. There is a process to perform decision making of a shift to the next phase).

3.2.2. Efficiency of Program management

The questionnaire items (e.g. Improved the effectiveness and efficiency of the allocation of shared resources.) about the efficiency of program management were derived from the study by Lycett et al (2004). The respondents were asked to indicate the efficiency of the program management from not applicable (scored one) to very applicable (scored five). Principal components analysis was used, and Cronbach's alpha (0.865) for reliability was carried out.

3.2.3. Performance of Program management

Also, the performance of program management measures (e.g. Enable the bundling of related projects together to create a greater leverage or achieve economies value.) was derived from the study by Lycett et al (2004). A five-point Likert-type scale (from "not applicable" to "very applicable") instrument attempted to capture the program management performance. Principal components analysis was used, and reliability was estimated by Cronbach's alpha (0.882).

3.2.4. Efficiency of NPD project management

The efficiency of NPD project management measures followed those used by Martinsuo, M., P. Lehtonen (2007). The respondents were asked to indicate the project ratio which achieved its aim about time, cost, budget, quality, and scope (e.g. Proportion of projects that keep up with the defined schedule.). Each item was evaluated from none (scored one) to all (scored five). Principal components analysis was used, and reliability was estimated by Cronbach's alpha (0.791).

3.2.5. Performance of NPD project

The questionnaire items related to NPD project performance were measured by 5 categories, all 12 items (financial, customer, process, program, company level: Abbie & John 1996), to assess average performance over the last 3 years. Each item was evaluated from not applicable (scored one)

Table 3. Measure descriptive and reliability coefficients

Measures (degree of management maturity)	Items	Mean	S.D	α
Strategy management	4	3.41	0.78	0.844
Process management	3	2.85	0.81	0.746
Organization management	3	2.99	0.81	0.714
Appraisement management	3	2.94	0.82	0.812
Organizational culture management	4	3.37	0.69	0.814
Scope management	6	3.31	0.81	0.904
Time management	3	3.11	0.82	0.834
Cost management	3	3.15	0.83	0.710
Quality management	3	3.49	0.90	0.858
Human Resources management	3	3.19	0.78	0.792
Communications management	5	3.26	0.75	0.846
Risk management	2	3.12	1.04	0.908
Procurement management	3	3.10	0.97	0.944
Integration management	4	3.60	0.86	0.887
Program management efficiency	5	3.16	0.71	0.865
Program management performance	6	3.12	0.69	0.882
Project management efficiency	4	3.30	0.66	0.791
Project performance	12	3.35	0.52	0.858

to achieve (scored five). Principal components analysis was used, and reliability was estimated by Cronbach’s alpha (0.858).

4. Results

Table 3 provides the descriptive statistics for the sample and reliability coefficients.

4.1. Organization management elements and the program management

Table 4 presents the regression analysis results. For the performance of program management, four variables – strategy mgt., organization culture mgt., cost mgt., and risk mgt. – show significant beta coefficients. Hence, the program management performance is positively correlated with factors of strategy mgt., organization culture mgt., cost mgt., and risk mgt... The other variables failed to reach statistical significance. Of the four variables, strategy mgt. and organization culture mgt. are factors of organization’s environmental management elements, while the other two variables are practical management elements that focus on projects’ delivery. For the program management efficiency, its efficiency is significantly and positively correlated with strategy mgt. and risk mgt. elements. But, Procurement mgt. shows significantly negative correlation with its efficiency. In this sense, the results support H1 and H2, partially.

4.2. Organization management elements and NPD project management

Table 4, also, shows the regression analysis results, the relationship between management elements and NPD project management. Three variables-organizational culture mgt., quality mgt. and human

Table 4. Result of the multi regression analysis

Dependent Variables	Program management				Products development project management			
	<i>Performance</i>		<i>Efficiency</i>		<i>Performance</i>		<i>Efficiency</i>	
	β	VIF	β	VIF	β	VIF	β	VIF
Strategy mgt.	0.234**	3.297	0.311***	3.298	0.031	3.363	0.054	3.319
Process mgt.	-0.021	3.010	0.083	3.019	0.143	2.937	-0.197	3.023
Organization mgt.	-0.057	3.134	-0.015	3.088	0.133	3.029	0.051	3.115
Appraisement mgt.	0.121	4.010	0.116	3.936	0.089	3.831	0.141	3.957
Organizational culture mgt.	0.420***	3.760	0.193	3.760	0.261*	3.699	0.064	3.787
Scope mgt.	-0.103	5.500	-0.126	5.621	-0.062	5.386	0.012	5.654
Time mgt.	0.064	3.834	0.176	3.817	0.076	3.470	0.161	3.656
Cost mgt.	0.215*	3.327	0.034	3.356	-0.035	3.235	0.125	3.368
Quality mgt.	0.025	3.885	0.016	3.821	0.368**	3.770	0.062	3.827
Human resources mgt.	0.070	3.405	0.124	3.364	-0.335**	3.243	-0.051	3.417
Communications mgt.	-0.165	4.920	-0.032	4.000	0.018	4.892	0.114	4.945
Risk mgt.	0.238*	3.921	0.240**	3.857	0.240	3.893	0.087	3.915
Procurement mgt.	-0.068	3.717	-0.230*	3.720	-0.006	3.725	0.073	3.767
Integration mgt.	0.067	6.597	0.083	5.995	-0.074	5.710	-0.045	5.885
R²	0.676		0.693		0.551		0.324	
Adjusted R²	0.620		0.641		0.474		0.212	
F	12.073***		13.365***		7.187***		2.879**	

Standardized beta coefficients are shown. *p<0.1 **p<0.05 ***p<0.01

resources mgt. -show significant beta coefficients. NPD project management performance is positively correlated with organizational culture and quality management elements. NPD project management performance is negatively correlated with human resources management elements. However, the results show no significant relationship between NPD project management efficiency and management elements. Thus, H4, proposing a significant correlation between NPD project mgt. performance and organizational culture mgt., quality mgt. and human resources mgt. is partly supported by the results. H3, however, is not supported.

4.3. Program management and NPD project management

Hypothesis 5 suggests that efficient program management will lead to improved project performance. The hypothesis is based on that program management has a role as resource allocation and project adjustment between grouping projects for performance improvement. And hypothesis 6 suggests that a single important project performance will lead to enhanced program management performance. Table 5 shows the results of the regression analysis for H5, and 6.

Performance of NPD project is significantly correlated with quality mgt., human resources mgt., and program efficiency. Of three statistically meaningful elements, human resources mgt. elements show negative correlation. Because NPD process is a high creativity process and also has a high uncertainty, team members need some degree of flexibility for productive NPD. The result table 5 shows that making a role of members clear constrains the project team's creativity or interferes with their progress. And program management performance is positively correlated with four variables – strategy mgt., organizational culture mgt., cost mgt., and risk mgt. –. Thus, H6 is not supported, and only H5 is supported.

Table 5. Result of the multi regression analysis

Dependent Variables	NPD project performance		Program performance	
	β	VIF	β	VIF
Strategy mgt.	-0.107	3.861	0.273**	3.327
Process mgt.	0.132	2.944	-0.041	2.954
Organization mgt.	0.113	3.004	-0.072	3.029
Appraisalment mgt.	0.068	3.819	0.077	3.875
Organizational culture mgt.	0.174	3.909	0.415***	3.777
Scope mgt.	-0.010	5.436	-0.208	5.338
Time mgt.	0.065	3.673	0.029	3.637
Cost mgt.	-0.050	3.224	0.224*	3.196
Quality mgt.	0.314**	3.783	-0.018	3.972
Human resources mgt.	-0.371***	3.198	0.070	3.456
Communications mgt.	0.005	4.843	-0.138	4.833
Risk mgt.	0.125	4.188	0.238*	3.971
Procurement mgt.	0.103	3.993	-0.093	3.618
Integration mgt.	-0.068	5.837	0.091	6.378
NPD project performance			0.107	2.195
Program efficiency	0.357***	3.418		
R²	0.583		0.668	
Adjusted R²	0.505		0.605	
F	7.448***		10.607***	

Standardized beta coefficients are shown. *p<0.1 **p<0.05 ***p<0.01

5. Conclusions, Discussion, and Further research

Based on a survey of 104 manufacturing companies from Japan, I have examined and discussed the effect of MCS factors in relationships between program and a single-project. In particular, I focused on what kinds of organization management elements affect each program and project performance. I then tried to find the gaps existing between program MCS and project MCS.

There are two main findings in this study (Figure 2 summarized our results). First, the results (table 4) indicate that some organization management elements affect program management performance, and efficiency. And, for NPD project, the results (table 4) also point out some organization management elements which are slightly different from program case affect its performance. Table 4 shows that as compared with program, project performance has a tendency to be affected by practical management elements relatively (program has a tendency to be affected by both environment management elements and practical management elements).

Second, the results (table 5), analyzing the links between program and NPD project indicate that the efficiency of program management affects performance of NPD project positively. However, there is no evidence a single-project (NPD project in this study) enhances program performance. This finding supports the key fact in this study that roles such as target-orienting, coordinating or directing by program (which is upper, broader level of project) have significance, but, in the reverse, each single-project performance is not directly reflected to the program. A role of program management is to manage and control grouping projects for achievement of program mission. Therefore, the result that

program management efficiency influences a single-project (NPD project) performance represents rational relations.

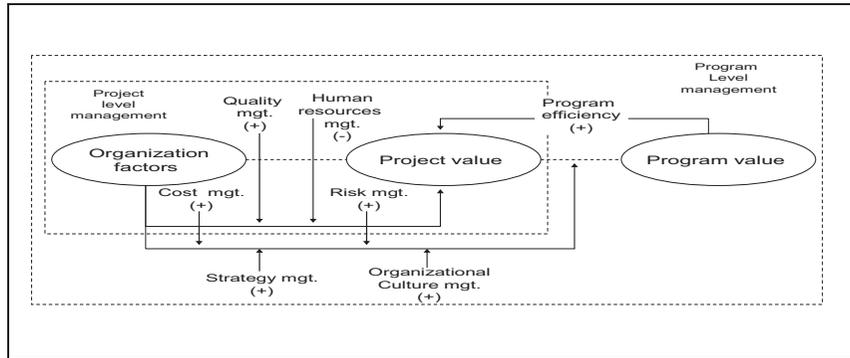


Fig. 2. Results summary

The results do not support the expectation that NPD project performance has an influence for program performance. It could be interpreted that, even if NPD project is important and also has a large influence in manufacturing industry, program management performance depends on managing grouping projects compositely, interfacing between organizational strategy and constituent projects in the program , and coordinating between program management and project management, not evaluating a single-project individually.

Also, one of the interpretations mentioned above supports the result indication that program management in comparison with project management receives relatively large influence from environmental management elements (management elements which thought as infrastructure of the project accomplishment in the organization) as well as practical management elements (management elements which assigned a focus to project accomplishment itself) .

In summary, in view of these research results, the way to realize an optimal organizational level performance is not delivering performance maximization of each individual project but reducing managerial waste by allocating organization's having resource efficiently between projects, sharing its knowledge, and adjusting and harmonizing projects in program. That is, according to the results, program level management is an important dimension to realize a value of organization level. At the same time, it became clear that not only the management elements which assigned their focus to project accomplishment directly but also infrastructural elements which support project accomplishment indirectly influenced a lot for program performance gaining.

The research has some limitations and needs further arguments. First, because of sample size limitations, during analyzing the data, I do not consider their business types and project types, which are one of the important factors to identify their MCS features.³ Second, there is little precedent

³ Shenhar, Aaron J. et al. (2001) argued importance of different success dimensions for different business types and project types. In this study, our analysis did not consider the business types, but I found there is no statistic significant difference with project and program performance.

empirical research for these purposes, so that I approached carefully with handing the questionnaire items. Lastly, there is no argument in this paper about tasks control that affects project efficiency.

Despite these limitations, this study provides particular empirical results and could contribute to offering a new view for further research. In particular, this study sheds light on organizational value-creating process by addressing program MCS as well as project MCS.

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