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MULTIPROJECT MANAGEMENT FROM A PRACTITIONERS POINT OF VIEW

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Abstract

Industrial project management has, in recent years, experienced an increased need for multiproject management. This study addresses this issue in the context of three business units in a large high technology manufacturing industry organization, aiming in particular to answer the questions if there exist any shortages regarding multiproject management and if so how they should be attended to. The major findings relate to the categories *organizing the multiproject environment, project method,* and *management of a project portfolio*.

The case study presented agrees with the theoretical framework in that a balanced matrix organization is preferable. Two contributing measures to achieve this balance are to unify the project managers in a common department, and to arrange workshops. In the theoretical framework it was indicated that conflicts between project managers and line managers is due to tensions between parallel projects rather than between functions and projects. In the case, it has been revealed that this is not always the situation. Moreover, it is indicated that one prerequisite for a functioning multiproject management is an implemented project management method. When such a method is in place improvements regarding the multiproject management can be focused. The implementation of a method ought to be supported by local project method managers, who supports projects and guides the work regarding incorporating process in working models.

Keywords: Multiproject management, project management method, matrix organization

1 Introduction

The breakthrough of project management came in the beginning of the1950-60th within the US armed forces, where different planning techniques were developed to manage complex projects that involved a lot of people [1]. In recent years, industry has seen a distinct trend towards performing more work in the form of projects. This includes a greater number of projects, smaller projects, shorter lead-time and involving team members shorter times in each project [2], [3], [4] and [5]. Such a situation leads to a need for multiproject management [2] and for a new thinking in general [5] and [6].

1.1 Objectives

The objectives of this paper are to present and discuss the results from a commissioned case taking place at three business units in a high technology manufacturing industry organization, Saab AB. The study in particular aims to answer the questions:

What shortages regarding multiproject management exist within the three business units? How should these shortages be attended to?

The study was performed as a case study, mainly based on semi-structured interviews.

2 Study context

Saab AB is one of the world's leading high-technology companies with its main operations focusing on defence, aviation and space. The Group covers a broad spectrum of competence and capability in systems integration. Saab develops, manufactures and delivers advanced products and services for the defence market, as well as for the commercial markets. Saab has the world as its market, but research, development and production are carried out principally in Sweden. The Group has a total of approximately 14,000 employees. Total annual sales are in the region of Euro 1,800 million and research and development corresponds to about 25 per cent of turnover.

Saab consists of six business areas and the business area studied is divided in three business units (BU). They are using the same project method and are roughly dealing with similar problems regarding mutiproject management.

Table 1: Data regarding the three business units.

Business unit	Number of employees in R&D	Number of R&D projects	Type of portfolio	Predominant in matrix organization
BU-A	Appr. 300	Less than 10	Heterogeneous	None
BU-B	Appr. 200	Less than 50	Heterogeneous	Line organization
BU-C	Appr. 1000	Less than 50	Heterogeneous	Line organization

3 Theoretical framework

The higher order objectives of multiproject management, in contrast to managing a single project, include completion of all projects to best reach the overall goals of the organization [7]. The key management problems in a multiproject setting are allocation of resources between ongoing projects on short-term basis, and knowledge transfer between projects on long-term basis [1] and [7]. Balancing long-term and short-range goals often leads to conflicts and the balance is effected by parameters like; strategy of the organization, composition of the project portfolio, form of organization, technology, resources, and further people and their skill. The effects owing to the goals and parameters discussed, include problems with resource allocation between projects, knowledge transfer, line managers acting as resource owners, standardized project routines, and fragmentized working conditions [1].

3.1 Organizing a multiproject environment

It has been argued that functional organization lacks in demonstration of strength and is not suitable for temporary organizations. The pure project organization lacks in a base for the long-range work, e.g., finance and commercialization [5]. To overcome the weaknesses and utilizing the strengths in functional organizations and project organizations, the *matrix organization* evolved [5], [6], [7] and [8]. Three conditions exist were the matrix organization is preferable compared with other organizational forms; more than one focus exist, claim for a

fast information process, and claim for divided resources [9]. Such conditions are quite common, and consequently the matrix organization is one of the most common ways of organizing multiproject activities. The matrix organization is, however, not without problems. Conflicts arise in such environments; organizational conflicts, conflicts between project managers and functional managers, and finally conflicts regarding systems like prioritization and scheduling systems [2].

Conflicts and unbalance between functions and projects occur frequently in matrix *organizations* [8] and [9]. The matrix organization is in conflict with itself since the main point could vary between three situations; strong functional organization, strong project organization and balance between functional and project organizations. Additionally, if the main point varies between different projects, great confusion might occur [2]. Further, it has been indicated that conflicts between *project managers* and *line managers* are due to tensions between parallel projects rather than between functions and projects [9]. Still, they also admit that more research in the area is needed to be able to generalize these indications. Many project managers experience little authority compared with line managers, while line managers experience that project managers interfere in their territory [7]. In spite of all this problems it is hard to find a better alternative to the matrix organization [5].

3.2 Project methods

Traditionally, literature on project management is focused on *planning and control* and commonly, project management is a matter of getting things done in right time, at budget and with a specified function, which has lead to great focus on planning instead of practical management [10]. However, a multiproject environment is turbulent, which leads to changing conditions for the projects and the planning [11].

Normally project methods contain activities like, e.g., description of objectives, risk management, project planning and budgeting [1] and [5]. However, executing certain activities is not enough. The activities ought to be placed in a *process* or similar, complemented with support tools and methods, and furthermore managed properly. Consequently, a well functioning multiproject environment demands processes, which could be defined as a series of activities with a defined beginning and end and which, with the aid of organizational resources, recurrently refines a measurable object from a deliver to a measurable result to a customer [12].

A similarity between many of the methods available is that they are based on stages and gates. Gates, or *tollgates* which they also are referred to, are superordinate decision points, at which formal decisions are made concerning the aims and execution of the project, according to a concept established in the company [13]. A tollgate decision is based on different aspects, for instance the project's status, its use of resources, and the expected benefits [13] and [14]. Consequently, such tollgates are important, not only for the unique project, but also for the balance of the complete portfolio of projects [14].

Traditionally, literature on project management focuses on the single project and its goals, but not on how *knowledge* and experiences from one project can be transferred to and be used in others [15]. A common method for project management can contribute to knowledge transfer and learning between projects [16]. It is important to find a balance between the reuse of methods and finding new ways of working [5]. Too much reuse of earlier experiences and knowledge leads to an outdating of methods and solutions, which is not long-time effective for the multi-project environment [1]. On the other hand, if the projects invent their own methods and do not reuse knowledge transferred from other projects, it is inefficient for the

multiproject environment and every project makes the same mistakes with little or no migration between the projects.

3.3 Management of a project portfolio

A project portfolio is a result from a systematical *selection of projects*, which has to be updated continuously [3]. On the other hand, the balance between resource requirements and resource availability is rarely achieved within organizations [2]. Projects in a multiproject portfolio differ in terms of size, required skills and urgency [2]. Depending of the *project mixture*, there are two types of multiproject settings; homogeneous and heterogeneous [1]. If the project portfolio is characterized as homogenous, the projects are of similar types, which contribute to a good possibility to exploit an accumulation of experiences between projects and to have a similar organizational behavior between the projects. If the projects in the portfolio are characterized as heterogeneous, such an environment can cause uncertainty and difficulties reusing experiences between projects.

Resource allocation is an important and critical issue for the multiproject management. There are dependencies within the multiproject portfolio and resources have to be effectively shared between the projects [1]. A key factor for a successful performance of projects is to identify critical resources and to show the consequences that will appear if the project does not get the resource it demands [17]. Dependencies between projects that are competing for the same resources can lead to unexpected problems of different kinds, for example delays. However, conflicts about resources can be avoided if the projects are planned by the same planning method [7].

As a result of limited resources, projects have to be *prioritized* and the project with the highest priority will get the resources. Large projects are often perceived to be more important than smaller ones and small projects within a multiproject environment therefore are at a constant disadvantage in the struggle for resources [2]. The most common way to handle multiproject planning is to treat all projects as parts of one entity [6] and [8]. There are a lot of tools and priority methods, but it should be emphasize that they are only tools to facilitate the priority decisions and selections [8].

4 Research methods

A *case study* is an empirical inquiry that investigates an existing phenomenon within its real-life context [18]. Such studies are especially useful when the boundaries between phenomenon and context are not obvious, and when “how” and “when” questions are being posed.

Interviewing is used to gain information on peoples’ experiences. In qualitative research, the purpose is to obtain descriptions of the lived world of the respondents as regards interpretations of the meaning of the described phenomena. In semi-structured interviewing, the researcher uses an interview guide, containing a sequence of themes to be covered in the interview, as well as a corresponding set of questions. However, the guide is at the same time supposed to provide for openness; the sequence and forms of questions may be changed during the course of the interview, and follow-up questions added [19].

Action research denotes planned changes aiming at elimination or reduction of an unsatisfactory state within a social system, and analysis of the effects of change. In action research there is a close connection between the role of initiating and executing changes and that of analysing the change process and its effects [20].

In order to answer the research questions, a case study, based on semi-structured interviews and also guided by action research principles was chosen. An “intermediate layer” consisting of project steering groups, project owners, line managers and project managers in the business units were investigated. As background knowledge several internal document were used together with a former investigation executed at one of the business units [21].

In total fifteen interviews have been executed with twelve persons. One local project method manager, one line manager, one project owner and one project manager were interviewed at each business unit. First the local project method managers were interviewed to identify and elucidate the suitable actors in the three business units. Then the line managers, project owners and project managers were interviewed. Finally, follow-up interviews were held with the local project method managers. All the interviews except three with local project method managers were recorded on tape and transcribed. The analysis was carried out through a process were the material was structured through allocation of codes. The results were then put together in a report [22]. Finally the material were analysed one more time by the interviewer together with the project method manager in charge at the business area, who is dealing with the matters in the daily work.

5 Results

The results emerging from the data analysis relate to the categories *organizing the multiproject environment, project method,* and *management of a project portfolio*.

5.1 Organizing the multiproject environments

All the three business units are organized according to a *matrix organization*. The line managers perform the function of resource owners and should provide the projects with appropriate *resources*. It is evidently that, at BU-B and BU-C, the line organizations are stronger than the project organizations. The project managers experience frustration due to great responsibility but without grand authority:

“The project managers have all the responsibility, but no authority. They are administrators, but are not able to direct, the functional managers have the power.” (Project manager at BU-B)

At BU-C, the line organization has a long tradition and the line managers are unwilling to make commitments regarding their personnel. On the contrary, at BU-A, the matrix organization seems to be in balance, at least at a first sight. However, it has been indicated that this superficial balance, could in fact be false, but the relatively small project portfolio simplifies the situation. Further, the main point seems to vary between different projects:

“Resource allocation is difficult and in the project method it is specified that a resource contract should be used, but this is not the case. The functional organization is to strong, and will not make commitments regarding anybody.” (Project manager at BU-C)

Even at BU-A conflicts between line managers and project managers exist. The conflicts concerns resources, and are usually solved by a discussion between the managers. One of the sources to the problem, is indistinctness regarding the *roles*. This is obvious at BU-B and BU-C, but exists even at BU-A. The clear majority of the roles are adequately described, but some of them are not implemented. At BU-B workshops has been arranged to discuss the roles, responsibility and authority of line managers and project managers.

All the business units have some of the project managers unified at a *common department*. At BU-B and BU-C the common department has limited authority, but the managers are involved

in the forums where resource allocation is accomplished. At BU-A the arrangement were judged as important even though the project managers are few. At BU-B, one of the interviewees emphasized an obvious risk for problems, since no cooperation exist between the project managers at the common department and the rest of the project managers.

5.2 Project method

In the case study, all the three business units are using the same project management method, which is based on Props, described in Ericsson (1994). However, the *actual utilization* varies between the business units. At BU-A, the method has a good acceptance and is applied into the rules and regulations and the daily work. On the other side, within some parts of BU-B and BU-C, the method is judged as a framework and guidance, without demands for application:

"My feeling is that the project management method is judged as a book of reference for project managers only. But actually it is so much more, e.g. the relations between functional managers, project managers and project owners." (Local project method manager at BU-B)

At the BU's studied, many managers at different levels, seem to have problem regarding finding use of the method. Among other things, this has resulted in sub-cultures and defective use of tollgates, especially at BU-B and BU-C. Project owners prioritize other activities before these decision points that have been determined on beforehand:

"Tollgates are supposed to take place, but it is rather new … milestones are planned for, but to execute a tollgate-meeting I think that there should be a reason. We do not have the kind of projects that could be terminated." (Project manager at BU-C)

At BU-A tollgates are treated more seriously and a local project method manager is supporting when a new project is started or whenever needed. A lot of energy has been performed integrating relevant processes into the project method. Some minor mistakes were done, but the method is judged as implemented at BU-A. This is hardly the case at BU-B and BU-C.

Knowledge transfer is not performed in an organized form at any of the BU's studied. The project method used prescribes that a final report were experiences regarding lack in project performance should be written. However, the management does not require it, and accordingly it is not being prioritized.

5.3 Management of a project portfolio

The project portfolios at all the three business units studied are *heterogeneous*. They are composed of projects with different sizes, different types, different durations and some are financed from external and others from internal stakeholders. Still, some *dependencies* are able to find between most of the projects within a business unit. The greatest dependency concern human resources, but also dependencies regarding the products, buildings, test objects and other equipment are obvious. Conflicts regarding humans are more evident at BU-B and BU-C than at BU-A.

At the product development department at BU-B, the line managers and the project managers fill in a *resource allocation matrix*. The matrix is linked between different levels, which allows the managers to test different scenarios regarding projects and their resources, At BU-A a similar tool is used, however, without links between different levels. At BU-C the allocation of resources is further scattered. The use of *resource contracts* is in practice delimited to BU-A. Further, the following of agreements varies. At BU-A the agreed resources in a projects are explicitly safe, and resources are not discontinued without a new

agreement. At BU-B broken agreements occur, and at BU-C an obvious unwillingness to promise resources to projects exists. Moreover, at BU-C problems exist regarding knowing if projects engage the resource owners to deliver resources or results.

"Other projects are mostly not taken into consideration. We do not know if we have resources, that is the hard part and the heart of the matter." (Project manager at BU-C)

In spite of the varying unwillingness to make agreements regarding resources, all the BU's have one thing in common; if possible, conflicts are solved at a low level. If a conflict is not possible to solve at one level, it is forwarded to the next level. The *information* concerning prioritazion between projects is somewhat insufficient. At BU-C a structure for spreading decisions and prioritazion exist, but only to managers. Consequently, the decisions do not reach the executing people. Also at BU-B problems exist regarding decisions that do not reach all the involved persons.

6 Analysis and discussion

All the three business units are organized according to a *matrix organization*, but with varying degree of balance. At BU-B and BU-C the line are stronger than the projects. The line organization has a long tradition and the line managers are unwilling to give up the power. In the ambition to found a better balance, all the business units have some of the project managers unified at a *common department*. However, those departments do not concern all of the project managers, which involve an obvious risk for setback.

Indistinctness regarding the *roles* has been identified as a source to conflicts. The clear majority of the roles are adequately described, but some of them are not implemented. According to the literature, many project managers experience little authority compared with line managers, while line managers experience that project managers interfere in their territory [7]. Further, it has been indicated that conflicts between project managers and line managers is due to tensions between parallel projects rather than between functions and projects [9]. Still, in the case, the majority of the conflicts mentioned, are about human resources and unwillingness to make commitments. The project managers experience frustration due to great responsibility but without grand authority. They are administrators, and the functional managers have the power. Particularly at BU-C, it is uncertain if projects engage the resource owners to deliver resources or results. The latter could be explained by unbalance in the matrix organization, which has lead to lack in communication between the main roles in a project, see Figure 1.

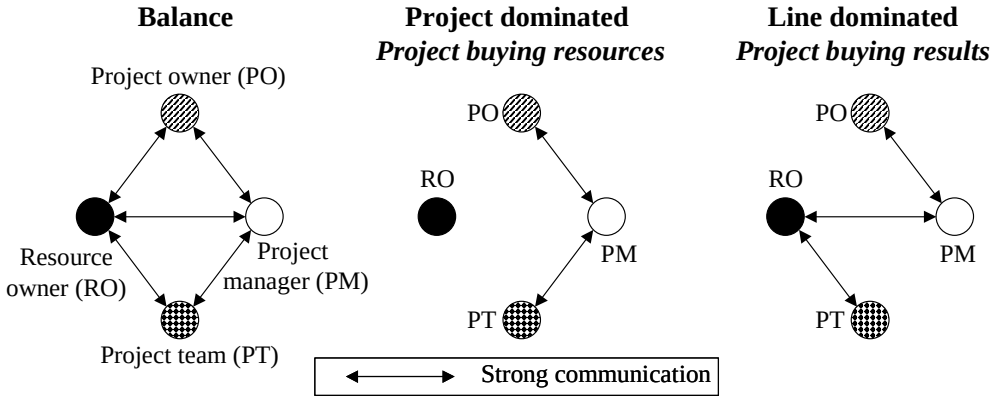

Figure 1. Examples regarding communication in organizations at three different situations; balance between functional and project organizations, strong project organization, and strong functional organization.

All the three business units are using the same *project management method*. The method insists on local working models at each BU to enable the implementation [13]. The actual utilization varies between the business units. Within some parts of BU-B and BU-C, the method is judged as a framework without demands for application. One possible reason is lack in education regarding the method and that many managers seem to have problem finding use of the method. Further, the actual work in the project management method ought to be put into practice through processes. A lot of energy has been performed integrating relevant process into the project management method at BU-A, but not just as much at BU-B and BU-C.

A common method for project management can contribute to *knowledge transfer* and learning between projects [16]. The project method used supports knowledge transfer e.g. through a final report were experiences regarding lack in project performance should be written, but this activity is insufficient in the case. The project portfolios at all the three business units studied are *heterogenous*. Still, some dependencies are possible to find between most of the projects within a business unit. The greatest dependency concern human resources. According to the literature, such an environment can cause uncertainty and difficulties reusing experiences between projects [1].

To achieve a glowing *multiproject environment* all the main activities has to be planned for aggregative, even though such an environment is turbulent and plans are changing [11]. Further, the importance of tollgates is obvious, not only for the unique project, but also for the balance of the complete portfolio of projects. At BU-A local project method managers are supporting when a new project is started or whenever needed and the benefit of tollgates has been realized. At BU-B and BU-C project owners prioritize other activities before tollgates.

The balance between *resource requirements* and resource availability is rarely achieved within companies and that they should limit the ongoing projects by some kind of selection system [2]. Further, a key factor for a successful performance of projects is to identify critical resources and to point out consequences of not providing the projects with the resources they demand [17]. In the case, different kinds of resource allocation matrixes are used to control the resources. Some of the matrixes are linked between different levels, and provides a good contribution to the project selection system. Still, several problems are obvious in the case. Broken agreements occur, and at BU-C there are even an unwillingness to promise resources to projects. BU-A has been more progressive regarding resource management. The agreed resources in a projects are explicitly safe, resource contracts are used to secure this, and resources are not discontinued without a new agreement. Reasonably this could be explained by more distinct and trying customer requirements, which among other things has forced the organization to secure that time limits are attained.

7 Key conclusions

The case presented agrees with the theoretical framework in that a balanced matrix organization is preferable. Two contributing measures to achieve this balance are to unify the project managers in a common department, and to arrange workshops where representatives from all the important roles contribute. However, in the theoretical framework it was indicated that conflicts between project managers and line managers is due to tensions between parallel projects rather than between functions and projects. In the case, it has been revealed that this is not always the situation. It is indicated that the balance of the matrix organization and the elucidation of roles have an influence on this.

Moreover, the results as well as the theoretical framework clearly indicate that one prerequisite for a functioning multiproject management is an implemented project management method. When such a method is in place improvements regarding the multiproject management can be focused. The implementation of a method ought to be supported by local project method managers, who supports projects and guides the work regarding incorporating processes in the working models.

The project portfolio in an organization has to be limited by some kind of selection system and the ongoing projects managed methodically. Tollgates, resource matrixes and elucidated roles are examples on important elements to enable this.

In retrospect, the combination of having an external researcher and an internal manager working together with improving the multiproject management also must be seen as successful, not at least considering the mutual knowledge transfer that took place.

Finally, it is recommended that future work should concentrate on rather basic issues and not so much on optimizing different tools like e.g. resource allocation. It has to be remembered that such tools should be treated as *support tools*, not as exact science.

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