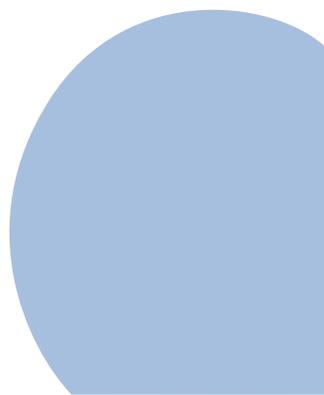


**Theoretical introduction to case study  
on Microsystems.**

**Work Package 2**

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# PROJECT PORTFOLIO MANAGEMENT WITH THE USE OF IT TOOLS

## Case Study based on the experiences of MICROSYSTEMS



### Introduction

Project management is one of the major challenges for the modern economy. Dynamic changes in the structures of organizations which form the core of the economy imply changes in both management processes and structures. One element of these changes is a new approach to the manufacturing of modern and rapidly changing products (due to changing market requirements). As part of these changes, traditional organizational structures are replaced by dedicated project teams. With the growing importance of projects for an organization, the issue of their management becomes more important as well. The issue is particularly evident in the IT industry, where complex (difficult to pre-define) and unique projects with a high implementation risk are realized by diffused (difficult to manage) project teams. Assuming that the problem of IT project management is important for the processes of the modern economy, for the management of organizations and for the IT market, this text presents an analysis and evaluation of methods of IT project management. The purpose of this evaluation was to diagnose the causes of failed projects and to identify a solution which can improve IT project management processes, with particular emphasis on the use of methods for managing such projects.[1]

## What is project management area (by PMI PMBoK®)[2]

### Project Management Context

Project management exists in a broader context that includes program and portfolio management and project management office. Frequently, the hierarchy of strategic plan, portfolio, program, project and subproject is used. A program consisting of several associated projects will contribute to the realization of a strategic plan.

Source: [2]

Very important thing in project management is to see structures and differences between programs and project portfolios.

## **Programs and Program Management**

A program is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually<sup>3</sup>. Programs may include elements of related work outside of the scope of the discrete projects in the program. For example:

- A new car model program can be broken up into projects for the design and upgrades of each major component (for example, transmission, engine, interior, exterior) while the ongoing manufacturing occurs on the assembly line
- Many electronics firms have program managers who are responsible for both individual product releases (projects) and the coordination of multiple releases over a period of time (an ongoing operation).

Programs also involve a series of repetitive or cyclical undertakings. For example:

- Utilities often speak of an annual “construction program,” a series of projects built on previous efforts
- Many nonprofit organizations have a “fundraising program,” to obtain financial support involving a series of discrete projects, such as a membership drive or an auction
- Publishing a newspaper or magazine is also a program with each individual issue managed as a project. This is an example of where general operations can become “management by projects” (Section 1.3).

In contrast with project management, program management is the centralized, coordinated management of a group of projects to achieve the program's strategic objectives and benefits.

Source: [2]

## **Portfolios and Portfolio Management**

A portfolio is a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives. The projects or programs in the portfolio may not necessarily be interdependent or directly related. Funding and support can be assigned on the basis of risk/reward categories, specific lines of business, or general types of projects such as infrastructure and internal process improvement.

Source: [2]

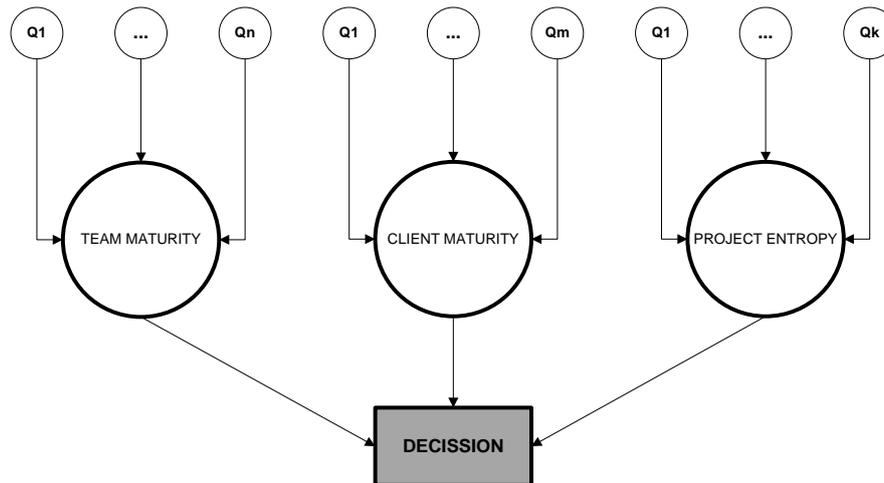
## **Decision-making mechanism in IT companies (how to manage project area elements)**

As mentioned earlier, IT project managers, choosing the method (e.g. RUP, Prince, SCRUM) with which they intend to carry out project tasks, should be aware of the consequences of improperly matching the chosen method to the realities of the project. The improper choice of a method is likely to result in exceeding one of the fundamental project limitations (such as budget, scope or schedule, and, at worst, a few of them). It thus seems appropriate to look closely at the project realities before deciding "how to implement the project". At first we can define three basic areas (variables) that should be addressed by the project manager. The areas include:

- maturity of the organization and / or team
- maturity of the client and his organization
- project entropy (level of information ordering / risk representation)

Each of these three elements (entropy, the client and the team), which contribute to the project realities, should be taken into account by the manager before project implementation is initiated. It is difficult to determine which area is most important; however, due to current observations, it can be concluded that each of them is important from the viewpoint of matching project management methods. Misunderstanding the client and disregard for the client's level of knowledge (or absence of it) about the specific features of IT projects will most often lead to the generation of unexpected variability (e.g. requirements). Finally, the lack of recognition of the maturity level of the team (as referred to in the next section) may degenerate into a lot of complications in the project work.

The separation of the three major decision variables led to the development of a skeleton for a decision-making mechanism (as shown in the figure below).



**Figure 2 Pre-processing model for generating decisions**

It is also clear that the aggregated variables outlined above (organization maturity, client maturity, and entropy) consist of a large number of minor parameters. It also seems that managers find it difficult to answer whether their team is mature, or to directly assess the client's level of maturity.

Therefore we can observe few elements of pre-processing in the decision-making mechanism – which means modeling the input data in such a way that via a set of questions posed to the manager, the client and the team members, the values of these three main parameters could be determined.

A closed list of questions is planned to be created, which will allow the inference of the project entropy, and the maturity levels of the client and the organization.

At the current stage of research, the most recognized areas are the organization and the manufacturing team (the appropriate software is being developed, using intelligent agents to determine the level of maturity, based on competence questions).

### **Team management in IT projects (maturity)**

The issue of project team maturity comes directly from classical management theory, which mentions planning as one of the fundamental processes. Planning processes are the domain of the IT projects manager, before they are actually initiated. The selection of the team is included in basic resource planning. Project teams often consist of people from many departments and many areas, and their task is to realize a common goal. To achieve the goal, a lot depends on the degree of maturity of the team and on interaction between team members. The inclusion of people with the same qualities within one team most often leads to unconstructive conflicts[3].

The role of the manager is, therefore, to select team members in such a way that they are mutually complementary. It is a different situation if the team has been established from the beginning and created without much involvement of the head (so-called imposed teams). In both cases, the manager should choose such a method of management which will be most suited to the state of the team. The state of the team - a set of experiences, skills and personality predispositions - has been defined as team maturity.

### **The issue of maturity**

The earlier analysis of the methods used in project management, as well as the best practices applied by project managers, has shown that one of the main problems which project managers must face is the selection of an appropriate method or an appropriate set of best practices for managing such a project. From the point of view of the project's realization, the selection of a management method is crucial for the proper development of the project. It would seem that an IT project is considered as completed successfully provided that it fulfills the classic project constraints (the realization of a project is carried out within the schedule and budget, and in its full scope). However, this argument can be agreed with only partially. This is because the classic triangle of constraints is created by previous actions and decisions carried out by the project manager. The project scope is determined mostly on the basis of discussions with the client, the schedule is determined based on the assessment of the resource potential of the company which is to implement the IT project (the provider), the budget is usually the result of the evaluation of the project team's workload on the part of the provider, and on the client's financial means. Hence, it can be concluded that before the project manager can make decisions regarding the implementation of the project within the variables of the classic triangle of constraints, the process of a preliminary analysis of these variables becomes necessary.

Taking into account the best practices contained in the methods of project management (presented in the section above) and the need to complement the classic triangle of constraints with an additional set of decision variables, three project areas have been identified which need to be analyzed before the project is initiated.

The first of these areas includes client processes in IT projects. The client is usually the main recipient of the product resulting from the IT project. The previous decomposition of project management methods into best practices has drawn attention to a number of

guidelines and recommendations related to the presence of the client, in many cases incorporating the client into the manufacturing and management processes (SCRUM, XP PROGRAMMING), also recommending the client's constant presence in the project. This means, therefore, that without in-depth knowledge of the client's status, the manager can find it difficult to make decisions on how to conduct the project. For if the client often changes requirements, the use of methods based on rigid planning and processes can be inefficient. The further part of this chapter will present suggestions for determining the status of the client in the project and regarding the analyses which the project manager should carry out in order to make the right decisions in the selection of best practices for project management, based on the client's status. All the factors relating to the analysis of the client's status have been defined as the aggregated decision variable – **CLIENT MATURITY**. [5]

Another area of decision-making processes discussed widely in all project management methods are team processes of the provider organization. It is the provider team, under the supervision of the project manager, that is responsible for the work to progress properly, and for how and when certain work is to be carried out. Thus, it seems reasonable for project managers to appropriately diagnose the capabilities of the project being implementing by the team they manage before the project is initiated. This diagnosis should regard project competence, as well as the skills required for group work. Such an analysis allows the project manager to appropriately allocate an appropriate role in the project to each participant. The correct allocation of roles increases the efficiency of work. Taking into account the fact that decisions about the selection of a project management method or the selection of best practices should be subject to the status of the provider team (as mentioned in Chapter I), it was concluded that another aggregated decision variable is **PROVIDER TEAM MATURITY**. [5]

The third area of decision-making processes is associated with the decisions of project managers in reference to the IT project which is being realized, and regarding the evaluation of project complexity, the volatility of requirements and the uncertainty of obtaining the final product. For most IT projects implemented incrementally, the requirements change over time, and the final product is not specified, thus defining tasks and manufacturing processes is difficult. The lack of sufficient knowledge about the state of the project results in the uncertainty of the manager, which hampers making planning decisions (both short and long-term). In connection with the incomplete (inadequate) level of information in an IT project, project managers need to adapt best practices to the current state of the project. It was therefore concluded that the current status of the project should be included as a decision variable called **PROJECT ENTROPY**. [5]

## Tools in IT project management

Another inherent feature of any IT project is the need to make decisions regarding the applicability of specific technologies. Depending on the approach, managers resort to different classes of software to support the supervision of project work. In fact, it becomes a rule that such tools are transformed into the form of mobile applications accessible for managers from a mobile device (a smart phone or a tablet).

Assessing the information technology market helps to point out that currently it provides a number of tools to support IT project management methods. The tools available for IT project management have the functionality to support best practices aimed at planning work and to facilitate the organization of project tasks or the management of a team. It is also worth noting that there are tools which are inherent to a particular method of project management (such as IBM Rational Method Composer, which supports the RUP method) or constitute complex solutions (such as Microsoft Project, which supports any type of project). In addition to what IT consortiums offer, managers have at their disposal a number of tools offered on the basis of *Open Source* (4pm.pl website allowed the use of hundreds of free tools to build project schedules).

The main category of tools to assist project managers are tools dedicated to managers of IT projects. The purpose of these tools is to provide support to the project manager in the tasks of planning, organization and control. They especially help the manager in carrying out particular activities in an IT project. They allow, for example, tasks to be planned and described, the team to be defined by assigning roles to participants or they allow the creation of a workflow structure, called *Work Breakdown Structure*. Tools supporting managers allow for the preparation of the most relevant project documentation and they streamline the circulation of documents through the availability of the project repository. The IBM Rational Method Composer is an example of such a tool, as it allows managers to define their own projects based on best practices of the RUP method. [4]

The second category of tools applied in projects are tools to support all the processes associated with manufacturing an IT product. Due to the fact that the product is mainly software, the tools to support manufacturing have a number of features to ensure the implementation of programming tasks. Therefore, such tools allow for software development, version management and monitoring changes in the developed software.

The discussion above is intended to show how complicated the matter of project management is and how complex the structure of the project can be, where not only the methods, but also the tools are relevant to the decisions made. If a tool is improperly matched to the specific nature of the project, there may appear complications in the project's implementation. To prove this point we can give an example of a situation which took place in one company where two teams operating according to the same project management method had different approaches to the application of an IT tool for project management. One team used the tool and measured all the stages of development; the other chose not to use the tool and documented everything on paper. This approach shows that the use of specific methods and tools in a project is affected by an additional factor - the maturity of the team. The issue of maturity, however, concerns not only the project team, but also the maturity of the client and the processes which take place during the realization of the project.

## Summary

To sum up, it is worth noting two issues. The first one concerns the selection of the team. The conducted experiments have shown how important it is to properly identify the maturity level and to subordinate an appropriate method of management to the level. The team maturity test may therefore be used and be examined by agents of the system supporting project managers.

Second important issue is to match correct technology for IT project management, especially when IT company have to manage many projects at the same time. Decision-making process should provide to match technologies according to team and client maturity.

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