

## Project Portfolio Management Applications

Lecturer Paul POCATILU, PhD.

Department of Economic Informatics, Academy of Economic Studies Bucharest

*The management of project portfolio in a company requires the use of specific software, especially when the number of projects is significant. When the projects are distributed on a wide area, the software has to meet additional requirements. This paper presents the main requirements and characteristics of the project portfolio management application.*

**Keywords:** *project management, project portfolio management, applications development.*

### Introduction

The main IT companies and research institutes are developing software solutions through the projects. The number of projects running at a given time is significant, which leads to difficulties in ascertaining the development stage of certain or several projects and the amount of resources involved in these projects. By organizing the projects in a portfolio, their management becomes a much easier task for the persons in charge, but this should be done only by using specialized software applications.

A project oriented organization performs simultaneously a large number of different projects and as the number of projects increases, the complexity grows higher. In order to reduce the complexity and to manage efficiently all projects to achieve the organization's objectives, the projects and programs are organized in a project portfolio and specific management is performed.

*Project portfolio* is defined as the set of all projects within a project oriented organization at a given moment in time and the relationships between these projects [GARE02], [APMR02].

In [APMR02a] *project portfolio management* is defined as the ensemble of processes that improve the results of project portfolio within an organization. [ARRT01] defines the role of the project portfolio management as the value/profit projects maximization, balancing portfolios regarding risk and resource allocation and aligning projects to business objectives. A similar definition is given in [LEVI03]: PPM is done in order to

maximize the contribution of projects to the overall welfare and success of the enterprise.

Many companies encounter financial problems because they are implementing projects that do not fit their company business plan.

Some of the PPM process objectives are [GARE02]:

- the optimization of the project portfolio results
- selection of projects to be started
- interrupting or canceling projects
- definition of projects priorities
- resources coordination.

The PPM process has mainly the following sub-processes:

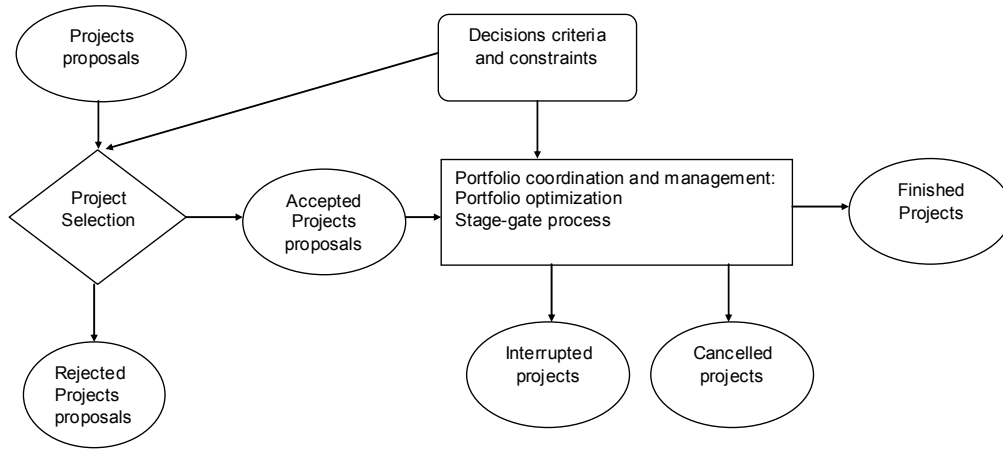
- projects selection and assignment
- project portfolio management and coordination
- networking between projects.

Based on these considerations, PPM flow is depicted in figure 1.

Using PPM in organizations, specific competences are used and the organizational structure requires new elements, like Project Portfolio Group and Project Management Office and specific responsibilities.

### PPM Applications Characteristics

IT projects are characterized through various elements and the management of these projects is influenced by a series of factors that have to be identified during the research. In order to develop the software system for IT projects portfolio management, the phases of analysis and design have to be fulfilled, after a rigorous documentation regarding the researched domain.

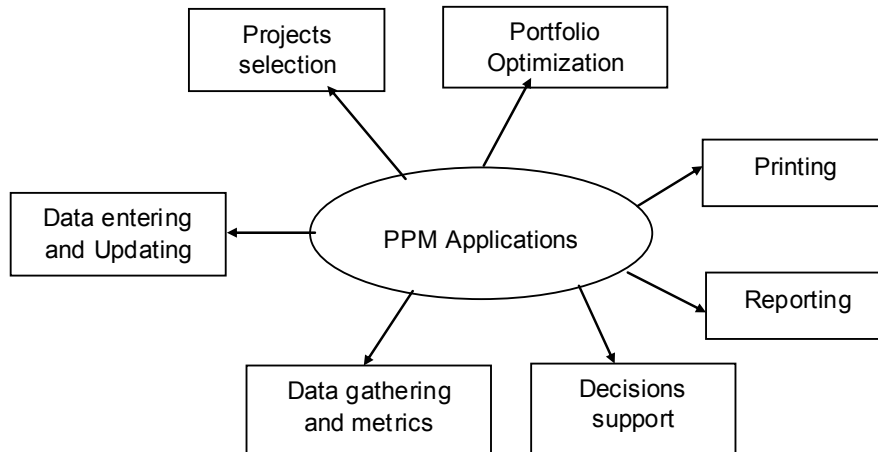


**Fig.1.** Project Portfolio Management flow

The PMM applications have to implement components for:

- entering and updating data about the projects and selection criteria
- projects selection
- portfolio optimization

- reporting
  - printing
  - data gathering and metrics computation (figure 2).
- Each component has a specific function and consists of input data, algorithms and results.



**Fig.2.** PPM Applications modules and functions

All the information about projects and programs are to be stored in databases. The following projects characteristics are stored:

- project name
- information about the project owner
- information about the project manager
- information about the organization
- project type
- project start and end date
- investment costs
- expected profit
- risks involved
- existing relationships.

The *project types* can be classified based on many criteria, such as projects phase, desti-

- nation, and novelty.
- Based on the project phases, there are two states, which a project can be:
  - conception
  - realization.
- Based on the destination criteria, the following projects types have been identified:
  - customer projects (external client)
  - organization projects
  - infrastructure projects.
- Based on the novelty of the project, the following types have been identified:
  - new projects
  - maintenance projects
  - upgrading projects.

The following relationships have to be shown:

- between the projects of the organization
  - between the resources involved in projects.
- Based on this information the data tables are designed and normalized in order to be used by the PPM applications.

The project selection is done using different criteria such as:

- project value
- risk involved
- return on investment (ROI)
- resources availability.

There are some important decisions that have to be taken during the life cycle of a project:

- starting projects
- terminating projects
- interrupting projects
- resource redistribution.

For each type of decision good criteria has to be defined. For example, a project can be terminated in the following situations:

- the project objectives cannot be accomplished
- the project does not align to the organization objectives
- the project produces losses
- the project has high risk and low profit,
- other situations.

All these criteria and constraints will be entered into databases and will help to automate the decisions regarding the projects from the portfolio.

The reports are a base for the decisions regarding the projects from portfolio. A good PPM application will deliver various reports, from simple lists of projects to charts of projects (bar charts, pie charts, risk/profit bubble charts). In addition, the reports provide information collected during the life cycle of the projects.

### **Distributed Applications**

If the PPM applications are going to be used in a distributed environment these have to meet additional requirements and a specific architecture.

Distributed applications consist of various components that run on different computers, and these applications integrate the actions of their components. The design of distributed

applications is based not only on the details of the individual parts, but also on the integration of the distributed components so that they would have a very good cooperation between them.

The main characteristics for distributed applications are:

- powerful graphical interfaces
- high reliability
- increased security
- high data processing and transmission speed.

Traditionally, distributed applications are based on the client server architecture or n-tier architecture.

The *client server architecture* consists of a server (application or database server) and a client side application that process data and present the results (application and business logic). This system is not flexible, it is difficult to maintain, and its components cannot be reused.

*N-tier architecture* has one or more tiers between the client application and the database server – application server. The application server implements the application logic and the client presentation logic. The major advantage of the n-tier architecture over the client-server architecture is the increased flexibility.

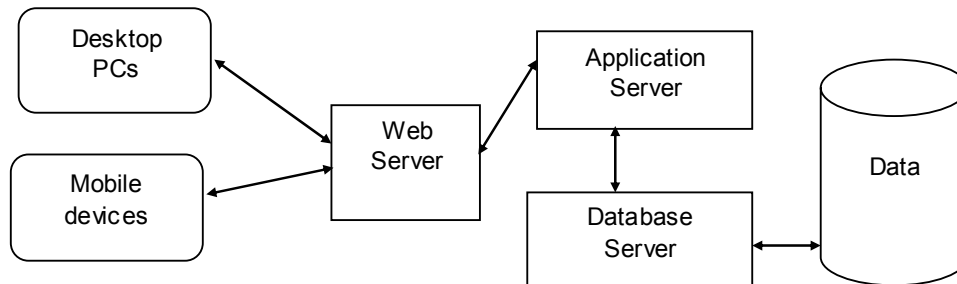
*Web based architecture* of distributed applications differs from n-tier architecture in two aspects:

- the client application has a reduced complexity, a simple Web browser (thin client).
- the business rules is based on components and is not a single system that implements the whole logic.

Usually, the following components are part of the architecture, figure 3:

- thin client (browser)
- web server
- database server
- application server.

Building distributed PPM applications lead to a great flexibility in the project portfolio management process. Also, including support for mobile devices (like mobile phones and personal assistants) these applications will have an increased mobility.



**Fig.3.** Web based distributed applications architecture

### Conclusions

Performing these studies and the methodology leads to new knowledge regarding the IT PM and PPM and the development of PPM applications. IT PPM applications would be developed easier applying a methodology developed to provide templates.

The existence of these types of applications and the knowledge of this domain leads to:

- a better PM
- efficient use of resources
- access possibilities from anywhere at any-time.

All these can contribute to ample development of information society and the project management.

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