



## **Project management – the contrast between classical and modern approaches**

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**Abstract.** A project is a discrete effort to compress a set of activities to achieve a specific scope for obtaining a final product or service. The actual experience shows that using modern management of projects lead to a better control over resources and better relations customer. Subject of this paper it is "Project Management – The contrast between classical and modern approaches". Choosing the theme of this article is not random, it continuing series of articles published for strengthen of scientific research in the Doctorate studies that I followed since 2005.

**Keywords:** Modern Project Management, PRINCE2, CCPM, CPM, PERT, Monte Carlo, scheduling, WBS, PERTMASTER, Primavera, Methodology Management.

### **1. Introduction**

In a market characterized by rapid changes, the managers must enroll in realistic projects to get good results. Overall customer satisfaction depends on the ability to deliver the required product on time, meeting criteria quality and, last but not least, the financial ones requested.

At the same time the stakeholders expect their investment in projects to be managed successfully, situation that leading to some pressure on the project working environment.

Many organizations miss entrepreneurial competitions required by modern projects, overtaking the time limits and/or budgets, effective “derailing” by their objectives through implementation of constant and major changes to originally planning which it’s proves sensitive wrong.

These errors can be explained by the use of outdated methodology for planning or unknowing theoretical-methodological and practical aspects of modern PM. Concepts and PM methodology and its derivatives strategies can help thousands of companies and government agencies in all sectors, improving their ability to manage projects and their activity.

Basically, modern PM, go beyond traditional business approach by implementing an initial planning, extremely clearly, through a discipline that characterized the general environment of projects, through a modern organizational structure of personnel, through a different approach on budgets, quality and risks, for delivering of a new product or service, successfully produced, in critical conditions of a deadline and budget firm consented.

One of the fastest and professional methods for micro- or macroeconomic growing of organizations, around the world, is the application of modern PM concepts and methodologies, fully accepted and used by contemporary specialists and modern managers.

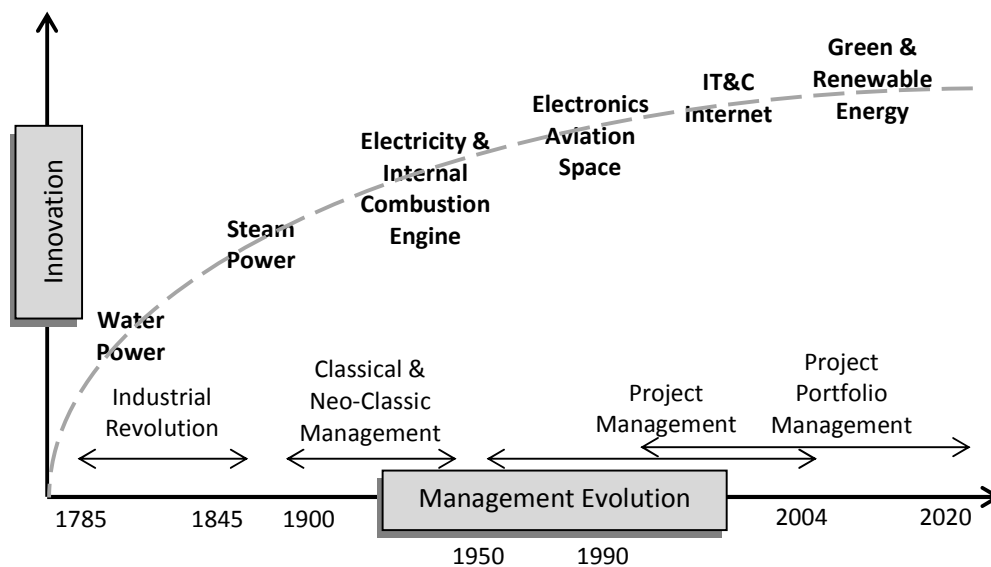
Thus is proved scientifically and practically, in the context of contemporary developments, considering that we need to know from the beginning that the product or service will or not be marketable or successful and considering that a project study is significantly cheaper than a negative result of the project, that the proper functioning of portfolios of projects, programs or projects at any level, it is imperative to be professional planned, since at the early stage using modern techniques specified by the modern PM.

## 2. The origins and development of modern project management

We can say that in one or another form that the projects have been undertaken for millennia:

- Pyramids of Egypt, built 4,500 years ago;
- Strategy planning of military campaigns implemented and documented by Sun Tze in his writings since 2500 years ago;
- Great Wall built between 475-211 BC;
- Transcontinental railways, Eiffel Tower, etc., built since the early nineteenth century;
- Other constructions of different sizes and complexity have been raised by people over time.

As we can see in Figure.1, as a complex and independently area, PM dates around the time of the Second World War.



**Figure.1** Management evolution depending of innovations periods

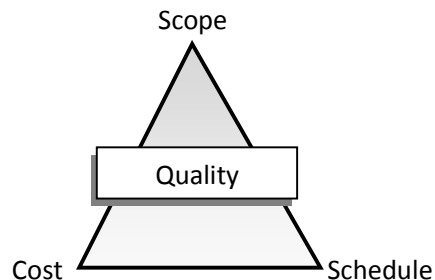


Erich Verzuh in "The Fast Forward MBA in Project Management considered that the moment that marking the transformation of the project management in discipline and independent profession is Manhattan Project (1942-1946) - building the atomic bomb. A project of this scale required a disciplinary human and material efforts and imposed a systematic approach to management methods. Manhattan Project drew attention to the need for specialists in project management as a distinct profession from those traditionally involved in a project.

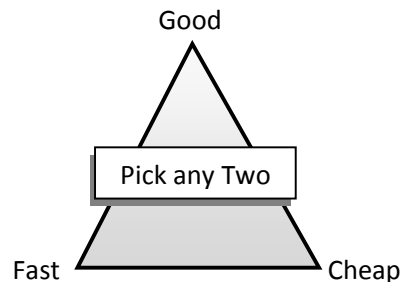
We present below, in chronological order, the most important techniques and tools for programming and organizing the process of projects, which formed the basis of modern PM:

- The "Bar chart" detected by Joseph Priestley, (England, 1765) and assumed and popularized by Henry Gantt as the Gantt Charts (USA, 1916);
- Flow-Line Scheduling - programming technique developed for building in record time the Empire State Building (1930);
- Line of Balance - technology developed by Goodyear Company (1940) and adapted by the U.S. Navy (1950);
- Milestone Charts (1940);
- Monte-Carlo stochastic analysis was discovered in the 1940s by physicists which working in the Manhattan Project - the atomic bomb production. Statistical-mathematical analysis Monte Carlo, is a class of computer algorithms that rely on repeated computerized random samples to analyze the results. Monte Carlo method was used primarily in mathematical and physical simulation systems. Recently, Monte Carlo modeling is used for determining the risk calculation projects;
- Activity of Arrow networking - computer technique developed by Kelly & Walker (USA, 1957) for closing plants and distribution vacant workforce;
- In 1959, it's developed Critical Path Management (CPM), a deterministic method, which takes into account variations in time for tasks, and uses only a single term that originally estimated or calculated;
- Program Evaluation and Review Technique (PERT) is a management tool for planning and control. It was developed by the Navy Special Projects Office in 1959 to control the development of Polaris submarine torpedo project (three-point estimate). PERT uses three time estimates (optimistic, most likely and pessimistic). Of these three estimates can be calculated an expected duration of the project;
- WBS (Work Breakdown Structures), Pert/Cost, Pert-Ramps (Multi-Project Resource Allocation & Scheduling) are some tools developed by NASA in the 1960s, tools that are used today in project management;
- Initially developed as "non-computer approach to scheduling" The Precedence Methodology (PDM) was developed by Fondahl in 1961 and was the basis for further development of computer tools by HB Zachry Co., Texas;
- GERT (Graphical Evaluation and Review Technique) described in 1966 in the Purdue University Pritsker is a network analysis technique that allows treatment of both probabilistic activity duration and the network logic. Used rarely, Project Management Institute eliminated the technique from PMBoK in 2004;

- Dr. Martin Barnes developed the concept of "The Iron Triangle of Project Management" (Figure.2), in a course, developed in 1969, in the UK. John Storck, an instructor trainer at American Management Association's in the "Basic Project Management" uses a triangle as in Figure.3, called "The Project Triangle" to define project scope;



**Figure.2** The Iron Triangle for Project Management



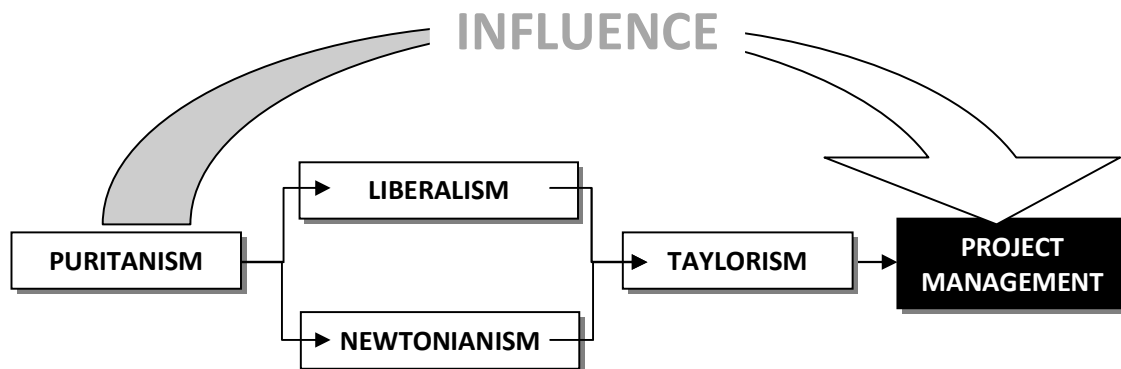
**Figure.3** The Project Triangle

- Latin Hypercube a statistical-mathematical method was developed to generate a values distribution of a collection of plausible parameters of a multidimensional distribution. The method applies on unsure analysis. The technique was first described in 1979 by McKay, but was drafted two years later by Iman R. in 1981. Details and application codes were revealed much later. Recently is used to estimate the risks of projects;
- PROMPII (Project Resource Management and Planning Organization) - the technique adopted by the Central Computing and Telecommunication Agency in 1979, in response to accusations that projects simulated by computer overcome time limits and budgets required by the initial feasibility studies;
- PRINCE (Project in Controlled Environments) set of techniques of PM product in 1989 by CCTA, for the development and implementation of IT projects;
- PRINCE2 - an upgrade of Prince being developed in 1996 considered the Puritan methods developed by the first version, unwanted and unnecessary and expands the use of technology across the implementation of IT project. In 2002 and 2005 PRINCE2 has been revised with references in concordance with international users community;
- CCPM (Critical Chain Project Management) is a method of planning and management of projects which focuses mainly on the resources needed to execute project tasks. It was developed by Eliyahu M. GOLDRATT in 1997. This is in contrast with traditional methods PERT and CPM, which emphasize task order and rigid planning. A critical network of a project will tend to keep the level of resources loaded, but they would need to be flexible in their starts moments to quickly switch between tasks and task chains for maintaining the whole project in initial parameters;
- PRINCE2 Revision is a major revision made in 2009 and that simplifies PRINCE methodology and introduces seven basic principles that will contribute to delivering projects at deadline with initially budget set;
- PERTMASTER from Primavera, modern software that is able to calculate the variables of cost and time on Monte Carlo estimates. Primavera Company was recently acquired by Oracle (10/2008), following the rule of market products dedicated to Project Portofolio Management;

- Stakeholder Circle – a new technology developed by an Australian company, who provides a 5 step process to identify, prioritize, view, engage and communicate with "the stakeholders that matter", and have as final result, the monitoring of effective communication with them.

The PM genesis idea can be traced hypothetical since Protestant Reformation in the 15th century. Protestants and later Puritans introduced a number of ideas including "reductionism", "individualism" and "Protestant work ethic", that resonates strongly with the spirit of modern PM. From the evolutionism perspective of modern PM, we can say that its philosophy includes aspects derived from trends: Liberalism - which includes the idea of capitalism and the division of labor and Newtonianism - trend who marking the scientific developments era.

All these philosophies influencing Taylor's scientific management theory, which was undoubtedly influenced by his Puritan "roots" (Quaker Organization), worked in a capitalist society (liberalism) and used scientific approaches in his work (Newtonianism), developing "Classical School" of scientific management which form the basis of the modern project management (Figure.4).



**Figure.4** The impact of Puritan ideology on aspects of project management

### 3. Major modifications between classical and modern approaches of PM

#### 3.1 Type of Projects

Many traditional organizations were founded to perform a set of stable processes in a repetitive and consistent manner. These factors of the activities assembly line remains principal in many organizations and it called continue development projects, because promote daily changing of organizations management manners, based on their stability and predictability.

Basic concepts of PM have been created specifically for continue development projects. Born from "Industrial Engineering and Operation Management", this bias is easily seen in the planning of documents and risk assessment methods that require predictability.

These projects are a product of the "industrial" or "mass production" influence over business thinking. Modern project management techniques have been and still can be used to identify the optimal performance of underway operational processes. While these projects continue to add significant value to



many organizations, new investment in products and services are increasingly targeted more towards unique projects.

Modern organizations have found that their attention should be given to unique projects that possess a reasonably or short deadline. These unique projects are designed to meet customer needs and a dynamic and competitive business environment. Unique projects start with a large number of unknown and requires substantial discovery processes. Each unique project concludes in a unique or highly customized result, which is produced by a unique collection of people using new methods and technologies, often unfamiliar.

Repetitive projects are found at the intersection of dominant continue development projects and contemporary unique projects. These projects occur if organizations were able to define general procedures which can be loosely followed when carrying out similar types of projects. These projects include construction projects, surgical procedures, operational guidelines and maintenance activities.

### **3.2 Differences between projects types**

All three types of projects tend to exist simultaneously in most organizations. On the surface, it would seem that in base of the solid training in PM we can apply the knowledge acquired in any of the above types of projects. The problem is, that normally, characteristics of each type of project are often diametrically opposite to the real situation. Many organizations have created their own management processes and ways of relating with their own projects based on assumptions of stability and predictability. These are not projects with unique character.

Projects with unique character usually follow custom processes, employs new technologies or developing, face the unknown areas, depend on multi-disciplinary workers from several organizations and produce customized final products.

The central point of the unique projects include the discovery, design, construction and implementation of processes and requires a planning process very dynamic and progressive, to respond quickly to new discoveries and also to unanticipated realities. Business management is carefully oriented to occasional exceptions or to situations generated by global crisis.

Continue development projects assume processes of stable business, of technological stability, of the activity-based on tasks, with known purposes and very predictable results. The main objective of a continue development projects is efficiency and correct and repeted execution of a defined process. Planning continue development projects provide a basic strategy, produced from stable estimates.

While unique projects get most attention and financial investment in most organizations, they are not really new types of project. They exist, traditionally, before launching a new “continue development projects”. During the Industrialization Era, R&D projects have been listed as such. The challenge for modern PM is to control through main processes, critical and significant, uncontrollable environment of R&D projects This will require a new process for PM and a rethinking of many traditional techniques.

Contrasts between traditional and modern models of project management we will examine further in Table.1, based on general management componets as PLOC model (Plan, Lead, Organize and Control).



**Table.1**

| <b>PM COMPONENT</b> | <b>TRADITIONAL APPROACH</b>   | <b>MODERN APPROACH</b>   |
|---------------------|---|--|
| <b>PLANNING</b>     | <ul style="list-style-type: none"><li>• Primordial establishing of activities programming, assigning individual tasks, scheduled holidays and adjustment of expected or unexpected periods;</li><li>• Assuming stable final products, processes and activities based on clearly defined tasks;</li><li>• Preparation of predictable and stable planning only, wich leading to expected results;</li><li>• Imobility of project members, realized by their strict specialization in certain processes.</li></ul> | <ul style="list-style-type: none"><li>• Division of organizational effort in well defined units;</li><li>• Effort estimation of each determined unit;</li><li>• Determine an effective order in which project processes can be executed;</li><li>• Layout of existing staff on specific activities packages to predetermined period;</li><li>• Redesign possibility of project whenever is necessary, or project "slip" from the initial planning.</li></ul> |
| <b>LEADING</b>      | <ul style="list-style-type: none"><li>• Exclusive applying of "Top-Down" technique in detriment of "Bottom-Up" technique;</li><li>• Using of ultraspecialized project managers in the field project, or hiring specialized consultants, who supplemented the work of the manager;</li><li>• Making decisions without consulting members of the management team.</li></ul>   | <ul style="list-style-type: none"><li>• Application of "Bottom-Up" technique correlated with positive aspects of "Top-Down" technique;</li><li>• Communicating to project team of project goals and objectives;</li><li>• Control and monitoring of projects "with team" and not "for team";</li><li>• Conflicts managing between team members by removing cultural differences and communication problems.</li></ul>  |
| <b>ORGANIZING</b>   | <ul style="list-style-type: none"><li>• Creating a strong control structure and activity monitoring of processes;</li><li>• Employment of qualified staff or budgets according to Project Manager prestige;</li><li>• Granting project manager with full functional and administrative authority over the entire</li></ul>  | <ul style="list-style-type: none"><li>• Setting clear of role and responsibilities necessary for project success;</li><li>• Modern organization of staff, through drawing up of the organization plan that allow filtering problems arising in projects, thus ensuring the objective and synthetic approach</li></ul>  |



organization. Administrative authority includes salary administration, training planning and employee evaluation. Functional authority includes the right to assign individual activities of different employees who will be controlled only by the project manager. When these issues dominate an organization, create serious conflicts for Project Managers of unique projects type.

of the project by the Project Manager;

- Organization of a structure of the project, who start with scoping and documenting its involvement and responsibility of each member of the team for achievement of the scope of project.

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**CONTROLLING**

- Establishing individual contributions in accordance with the objective of the project, and checking it regularly;
- Measuring the individual contribution of project team members in order to determine the percentage of achieving of the project goal;
- Controlling project progress at initial fixed period of time.
- Quantifying the qualitative and quantitative of project progress;
- Prior verification to fulfillment of critical processes and results that were promised to deliver;
- Fullfilment of objective criterias for the qualitative completion of the project objectives before completion is executed;
- Cheking performance and productivity by comparing scheduling (start date, duration, end date) with the current progress;
- Comparing with the ultimate revision of initial plan and not with initial plan

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According to the above, organizations must rethink their strategies for organizing and implementing the project, considering the failure of recognition of new techniques or concepts of PM, will obviously lead to the application of traditional tactics in modern projects, and so invariably, to failure them. Next we describe the main ways for implementing new techniques specific to modern project management in organizations.





#### **4. Implementing modern PM in organization**

The question who arises is: When is necessary to implementing modern PM in organizations ?

- When the organization is manage by a classic and old-fashioned management and can't cope to entrepreneurial environmental change;
- When there is implemented a Project Management system that is considered old and who not generate projects with satisfactory final;
- When the organization wants the processing standard of projects to be consistent with international standards (PRINCE2, PMI);
- When the organization wants accreditation and recognition of the PM progress by international bodies.

The first step in this approach is to create the vision that join the modern management of projects as superior and enable a focused discussion on the future of project management in own organization. Thus, awareness and view the truth of future claims is the first step in this direction.

- The future is in managing projects and needs a modern management;
- The pace at which business is developing change became overwhelming and modern management of the project contains a powerful set of techniques with which you can manage those changes;
- Managing project teams by recruiting well trained and flexible experts, able to cope with change imposed by businesses;
- Implementation of modern project management methods allow processing of project portfolios.

The next step is to transform this vision into a concrete initiative that will require resources and time. Creating frameworks for implementation of modern project management in organizations should follow the following objectives:

1. Identification of project goals;
2. Description of the role and processes;
3. Create performance standards in the project;
4. Revision of standards for staff evaluation;
5. Ensuring qualified staff and/or establish the politics and training infrastructure and their procedures;
6. Reorganization of the project and/or its objectives.

Developing standards and procedures in areas that present shortcomings and remodeling old ones according to the standards of modern management projects are decisive steps in the migration towards full implementation of modern management of projects.



In Table.2, we present some standards and procedures of modern management of projects, which must be met in approaching a project during its life cycle, but may be incomplete or unnecessary in some case, considering the particularities and variety of projects.

**Table.2**

| <b>Project Management Subject Area</b> | <b>Major Deliverables</b>   |
|--|---|
| <b>Scope</b>                           | Scope Document<br>WBS<br>Cost/Benefit Analysis<br>Change Management<br>Configuration Management           |
| <b>Quality</b>                         | Quality Assurance<br>Quality Plans<br>Quality Control   |
| <b>Cost</b>                            | Budget<br>Earned Value Reports<br>Cost Plan   |
| <b>Time</b>                            | Schedule Update Process<br>Schedule Reports<br>Project Estimate   |
| <b>Risk</b>                            | Risk Management Plan<br>Risk Qualitative Analysis<br>Risk Quantitative Analysis<br>Risk Response Document |
| <b>Communication</b>                   | Project Terms Glossary<br>Communication Plan<br>Issue Resolution Procedure                                |
| <b>HR</b>                              | Resource Planning Process (identify, plan, acquire)<br>Conflict Resolution Procedure                      |
| <b>Procurement</b>                     | Procurement Plan<br>Dispute Resolution Procedure  |

For superior managing of modern projects methodology can successfully use the module "Management Methodology" from Primavera (Oracle) who is a computerized system for performance and storage the methodology. By using the module presented can gather "best practices" and may be stored in a central location. This enables project managers to create custom project plans by selecting and combining existing methodologies, at the expense of creating new ones for each new project. Such, the activity can be improved continuously by imminent methodology improving.

Another important aspect of the organizational environment is the need to examine the loading of resources and processes of the two perspectives - time and budget. Measurements need to develop



computer simulations, in base of modern project management principles, using dedicated software module for project management. After project computer programming, can be seen easily the load level of the resources. It can choose to automatic leveling, operation successfully done by almost all software dedicated to project management. Of course, a computerized study needs to be changed whenever the projects slip in and out of initial parameters (very often at present).

The operation of re-planning of the project must be done in strict accordance and watching the purpose and objectives of the project to not deviate from it. There are situations, quite often, when the working environment of the project we approach requires major changes in the initial planning and which will finally lead to diversion objectives or even scope of the project itself. This requires the drafting of documents that describe changes in the present case, framing them (funded or unfunded changes, temporary or permanent), approval by the stakeholders, and preparation of projections of required changes results in subsequent development of project.

## **5. Conclusions**

Key of success in projects is to remember that modern management of projects is extremely adaptable, and can mold in any field, starting from research, medicine and up in the construction and industrial. Implementation of modern management of projects is necessary for us to integrate into a modern competitive work environment, caused by the requirement that international trade relations to be based solely on projects.

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