MEASURING PROJECT MATURITY: EXAMPLE IN A FRENCH AUTOMOTIVE ORGANIZATION

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ABSTRACT

Projects constraints are continuously growing in terms of time, cost, customer satisfaction, return on investment…they are also growing in terms of complexity, number of stakeholders, number of parameters to manage and number of interactions between these parameters.

During the last 15 years, project management community has demonstrated interest in methodologies developed to assess and improve project management maturity. A great number of organizations have been working on the problem and have developed different kinds of Project Management Maturity Models.

In this paper, we present research on project maturity at PSA Peugeot Citroën, a French automotive organization. The purpose is to understand and explain the importance of using a maturity model in organizations as a key factor of project success. We explain how the measure of project maturity helps to improve project control by using Key Maturity Indicators (KMI).

Keywords: Project maturity, maturity models, project control

1. INTRODUCTION

Companies must more and more innovate and be time- and cost- efficient and effective in order to stay competitive. Projects are one of the means that allow companies to translate strategy into results (new products, performance improvements, organization transformations …) and they usually involve a variety of human, financial and technical variables.

The companies must then adjust their project management (measuring performance, assessing maturity, controlling life cycle project…) in order to integrate more and more projects simultaneously, to increase the probability of success for projects with a high amount at stake and to control their projects for warranting a global multi-project success. With respect to project success, historically, projects have been managed as technical systems instead of behavioral systems [1].

But not only these aspects are related to success, people are also important to project success [2] and the more competent and mature the project managers or teams are, the more efficiently they will perform. Projects are typically assigned to project leaders by a person or people who have their own vision of what the end of the product should be [3].

Then, maturity has been expressed by some companies as a potential key factor for increasing performance, achieving goals and being successful. Project management community is increasingly interested in the maturity of project management and the competency of its project managers. Organizational project management maturity and competency seem to be promising constructs related to successful projects. [4][5]

A great number of organizations have been working on the problem and have developed different kinds of Project Management Maturity Models. In general, the models measure progress along five well-defined stages, ranging from the most basic project management abilities to highly sophisticated project management practices and culture.

In this paper, we show the first steps made on research as a part of PhD studies. We describe the notion of "project maturity" found in literature and gave by management practitioners after a benchmark carried out in six different industries. We analyzed different kinds of project management maturity models in order to develop a model oriented not only to measure the maturity of project management but also the maturity of a project during his life cycle.

2. MEASURING PROJECT MATURITY

2.1 Definition of maturity

There is no generally agreed definition of what a *mature project* is. The concept of process maturity was born in the Total Quality Management movement, where the application of statistical process control techniques showed that improving maturity of any technical process leads to reduction of the variability in the process and to improvement of the mean performance of the process. [6]

Andersen & Jessen [7] defines maturity as "a state where the organization is in a perfect condition to achieve its objectives. Project maturity would then mean that the organization is perfectly conditioned to deal with its project". For Kerzner [8], maturity in project management is the development of systems and processes that are repetitive in nature and provide a high probability that each project will be a success.

Some recommendations for obtaining maturity include [8]:
- Educate the executives to the benefits of project management
- Convince the executives of the necessity for ongoing and visible support in the capacity of a project sponsor
- Convince executives that they do not need to know all the details. Provide them with the least information that tells the most.

In the literature, the maturity models are focused in achievement of *project management maturity*. In our research, we use these models in order to develop a model to measure *project maturity*.

The term project maturity is the state where the project is in a perfect situation to achieve his objectives. It can be evaluated by the progress of process and procedures required for planning and development of the project.

Project maturity is also related to:
- Project Leadership: The ability to get things well done through others, leading with a focus on the project's goals and objectives and the effectiveness and efficiency of the process.
- Project Management: The ability to manage the scope, schedule, budget, risk and quality of project deliverables.
- Organization Context: Organization support for projects through effective prioritization and resource loading, as well as through standardized tools, templates and methodology.

2.2 Project Management Maturity Models

A maturity model provides a structured framework used to capitalize the knowledge and best practices in order to facilitate the decision-making and the launching of actions. The use of a model makes possible to create/make evolve the processes of a company, in order to optimize the efficiency of the practices and technical implementations.

Committing an organization to a significant improvement effort requires a thorough understanding of where the organization is and where the organization needs to grow. This is the need that is addressed by the recent interest and attention dedicated to the development of a great number of project management maturity models [9]. A recent study concluded that there are over 30 models serving the existing market, many of them have appeared in the mid-1990s that were more heavily influenced by the thinking of the project management profession.

Additionally, several authors have contributed to case studies that describe and illustrate the implementation of a specific model, typically in a single enterprise. These models will illustrate that there are differences among companies in their actual use of projects as a mean to achieve objectives. However, many of these models are rather limited in scope, having as their sole intention the categorization of the actual behavior of the organization. [1]

A mature organization has an organization-wide ability for managing projects based on standard, defined project management processes that can be tailored to meet the specific needs of individual projects. Thus, in theory at least, it should be possible to assess how mature a project-based

organization is by looking at a combination of what aspects of project performance or project management practice it measures, and what the results of those measurements show.

In reality, we will not find an organization or project entirely mature, consequently we can talk about a certain degree of maturity and trying to measure the maturity of the organization and their projects by a model or methodology. These imply that organizations, regardless of their maturity, will each measure the same things; what will distinguish the maturity of an organization is the score that is revealed by the measurement.

The models that have received the greatest attention in the research literature have been:
- Capability Maturity Model Integration [10]
- Berkeley PM Process Maturity Model [11]
- PM Solutions Project Management Maturity Model [12]
- Organizational Project Management Maturity Model (OPM3) [13]
- Portfolio, Programme & Project Management Maturity Model (P3M3) [14]
- Project Management Maturity Model [8].

In general, the models measure progress along five well-defined stages, ranging from the most basic project management abilities to highly sophisticated project management practices and culture. They differ from one another in terms of covered scope. As well, they are designed to identify areas upon which improvement efforts should focus.

Project management maturity models are often based on the processes grouped by knowledge area as described in the PMI PMBOK Guide [15] (project integration, scope, time, cost, quality, human resource, communications, risk, and procurement management), but with the adoption of some variant of the CMM maturity scale developed by the Software Engineering Institute (SEI) at Carnegie Mellon[4].

In our case of study at PSA Peugeot Citroën, we analyzed different project management maturity models in order to develop a model oriented not only to measure the maturity of project management but also the maturity of a project during his life cycle. We give a brief description of each model studied.

2.2.1 Capability Maturity Model Integration

The SEI Capability Maturity Model has been applied by thousands since his creation and his concept of process maturity migrated from measure software process to measure organizational process maturity. CMMI® (Capability Maturity Model® Integration) is a process improvement maturity model for the development of products and services. It consists of best practices that address development and maintenance activities that cover the product lifecycle from conception through delivery and maintenance [10]. The latest version of CMMI ver 1.2 was released in August 2006. There are 3 constellations of CMMI in the new version, namely: CMMI Development, CMMI Services and CMMI Acquisition.

There are two types of representations *staged* and *continuous*. A representation allows an organization to pursue different improvement paths. The continuous representation allows selecting the order of improvement organization's business objectives and mitigates organization's areas of risk. The staged representation provides a sequence of improvements, each serving as a foundation for the next and allows an organization to select a specific process area and improve relative to it.

Integral to this model is the concept that organizations advance through a series of five stages to maturity (staged representation) and six capability levels (continuous representation). Both representations are showed in Figure 1.

Maturity levels:
- **Level 5 Optimizing:** Focus on process improvement
- **Level 4 Quantitatively Managed :** Process measured and controlled
- **Level 3 Defined:** Reactive characterized for the organization and is proactive.
- **Level 2 Managed:** Reactive characterized for projects and is often reactive.
- **Level 1 Initial:** Process unpredictable, poorly controlled, and reactive.

Capability levels:

- 5 Optimizing
- 4 Quantitatively Managed
- 3 Defined
- 2 Managed
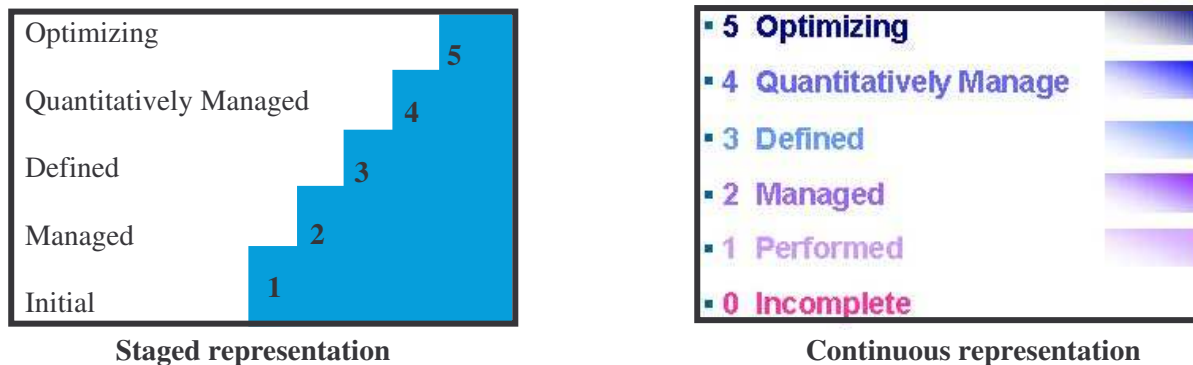- 1 Performed
- 0 Incomplete

Staged representation	**Continuous representation**

Figure 1. CMMI representations

2.2.2 Berkeley PM Process Maturity Model

The Berkeley Project Management Process Maturity Model was developed that uses statistical techniques to assess the maturity of PM processes and practices among different industries. His purpose is to assess PM strengths and weaknesses and to enable organizations to compare themselves with similar organizations. This model demonstrated sequential steps (five) that map an organization's incremental improvement of its project management processes: 1) Ad hoc, 2) Planned, 3) Managed at Project Level, 4) Managed at Corporate Level, 5) Learning.

The model progresses from functionally driven organizational practices to project driven organizations that incorporate continuous project management learning [16]. The organizations position within the model has been used to determinate its positions relative to the other companies. Ibbs and Kwak developed a benchmark for project management maturity as a part of a broader study to determine the financial and organizational impacts of project management [17]. They conclude that there were minor differences in maturity between the most mature and last mature sectors (engineering/construction and IS respectively).

2.2.3 PM Solutions Project Management Maturity Model

The PM Solutions Project Management Maturity Model is fully aligned with the Software Engineering Institute's Capability Maturity Model featuring 5 levels of maturity (Level 1 - Initial process, Level 2 - Structure Process and Standards, 3 - Organizational Standards and Institutional Process, 4 - Managed process and 5 - Optimizing process) and the Project Management Institute's PMBOK Guide assessing maturity in the 9 knowledge areas. The knowledge areas are decomposed into components for more details assessment.

In a recent benchmark prepared by the Center for Business Practices using this model [18], the results show that 88.9 % of organizations are at level 1 maturity, 6.3% at level 2, 3.2% at level 3, 0.8% at level 4 and 0.8% at level 5. Therefore, it may not be so important to know the level of maturity, but rather what specific actions will be implementing to move the organization forward. What is most important is that the organization has a vision and is moving to improve the capability of PM with much targeted efforts.

2.2.4 Organizational Project Management Maturity Model (OPM3)

In 1998, the Project Management Institute (PMI) launched the Organizational Project Management Maturity Model (OPM3), program to pursue the accreditation of the maturity model as a PMI standard to be used globally. This model has 3 interlocking elements [13]:

1. The Knowledge element describes organizational project management and organizational project management maturity, explains why they are important and how project management maturity can be recognized.
2. The Assessment element presents methods, processes and procedures that an organization can use to self-assess its maturity
3. The Improvement element provides a process for moving from its current maturity to increased maturity.

The goals of OPM3 are to:
*   Assess organization's ability to implement strategic planning, when managing its portfolio of projects.
*   Provide tools to help businesses drive performance improvement.
*   Consolidate best practices for enterprise PM for individual projects.

These goals, even if not formalized within the organization, will likely be a valuable resource to assist the organization in adopting a project management culture.

2.2.5 Portfolio, Programme & Project Management Maturity Model (P3M3)

The OGC (Office of Government Commerce) has introduced a government standard Portfolio, Program and Project Management Maturity Model (P3M3) which is an enhanced version of the existing Project Management Maturity Model (PMMM), which it officially replaces, but will nest within it. P3M3 focuses on the addition of portfolio and program management to the model, describing the key process areas that contribute to achieving a successful project outcome. It can be used in several ways (e.g. to understand and identify the key practices that need to be fully embedded within the organization to achieve the next maturity level).
The levels described within the P3M3 (Level 1 - Initial process, Level 2 - Repeatable process, Level 3 - Defined process, Level 4 - Managed process, Level 5 - Optimized process) indicate how key process areas can be structured hierarchically to provide transition states for an organization wishing to set realistic and sensible goals for improvement (Level 1 – 2 areas, Level 2 – 11 areas, Level 3 – 12 areas, Level 4 – 4 areas and Level 5 – 3 areas). The 32 Key Process Areas in P3M3 have a consistent structure, which is both descriptive and focused on outcomes. These are:

*   Functional achievement / process goals
*   Approach
*   Deployment
*   Review
*   Perception
*   Performance Measures

The P3M3 recognizes not only the program and project management activities being carried out at the individual program and project level, but also those activities within an organization that provide focus and help sustain effort to build a program and project infrastructure of effective program and project approaches and management practices. [14]

2.2.6 Project Management Maturity Model

The Project Management Maturity Model developed by Harold Kerzner [8] identifies five levels for achieving excellence in project management:

- Level 1: Common Language is the basic knowledge of PM and the terminology used.
- Level 2: Common Processes defined and developed are applicable and repeatable.
- Level 3: Singular Methodology is the synergistic effect of combining all corporate methodologies.
- Level 4: Benchmarking process improvement is required to maintain a competitive advantage.
- Level 5: Continuous Improvement evaluates the enhancement to PM from each improvement.

Kerzner developed this model by studying project management efforts and lessons learned in hundreds of organizations. In his project management maturity model (PMMM), certain levels can and do overlap, but each level must be completed before moving up to the next level. The magnitude of the overlap is based upon the amount of risk the organization is willing to tolerate.

3. MATURITY OF AUTOMOBILE PROJECTS: A CASE OF STUDY

The case study is carried out at PSA Peugeot Citroën, a French automobile and motorcycle manufacturer. The purpose of an automobile project is to develop a product and its manufacturing process, in order to carry out the requirements of services, quality and production cost, taking into account development and cost & time constraints. Actions are carried out in order to hold these objectives, they are in conformity with methodologies and standards of the company, and are progressively detailed when the project advances. The project approach is communicated to project team members and stakeholders, and project activities are carried out in accordance with the project plan and the defined process.

In the initial phases of a project, different actions concerning the formalization of the objectives, the planning and the attribution of the roles are carried out. In this stage, measurement of project maturity becomes more complex and important to manage compared to the last phases of the project, where maturity is estimated through the measurement of quality results: the project convergence is checked through physical indicators appreciated on the assembled parts, vehicles produced, etc.

For PSA Peugeot Citroën, project management is a dynamic process that influences corporate and business strategy. So the company has an interest in developing a measuring instrument of project maturity that will allow:

- to remake/replanted project control actions
- to take robust decisions
- to optimize the processes
- to evaluate the assignments of resources and competences, as well as methodologies of development

In this research, a benchmark study was done in order to analyze the importance of a project management culture in organizations, the impact of people interactions into a project success and what a project mature is. Project managers and management practitioners from six different industries (IT, automotive, health, transportation…) were interviewed; consequently we can conclude that the differences in maturity among different industry sectors were not significant and that it's not enough to use only performance indicators for measuring project maturity.

As a result of the benchmark, the concept of project maturity was related to:

- The accomplishment of milestones.
- The use of maturity indicators during the project life cycle.
- The stability of cost estimation at the end of the project.
- The maturity of project staff
- The maturity of development process

Actually, the CMMI is used but it is not a standard for this organization. However, it was used as well as PMBOK and the other models for a re-organization i.e. project management maturity areas were

identified. For each area, we defined maturity levels in order to establish a framework for measurement of the project maturity during his life cycle.

3.1 Research objectives

This research is conduced to determinate the level of project maturity by using a model. This model adopts a two dimensional framework. Both of the dimensions are based on accepted standards (PMBOK and the maturity models analyzed). The first dimension reflects the level of maturity in each stage of the life cycle of an automobile project. The second dimension depicts the key areas of project management addressed. This dimension adopts the structure of the PMI's nine knowledge areas [15] but organized in 5 global areas. Each area was decomposed into key components based on specific capabilities of an automobile project. The structure of this framework is presented in Figure 1.
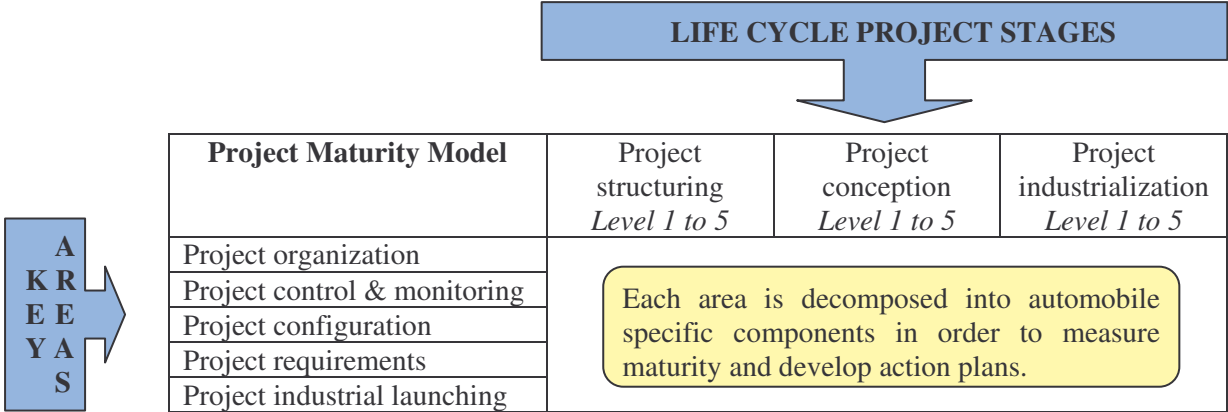
LIFE CYCLE PROJECT STAGES			
Project Maturity Model	Project structuring *Level 1 to 5*	Project conception *Level 1 to 5*	Project industrialization *Level 1 to 5*
Project organization			
Project control & monitoring	Each area is decomposed into automobile specific components in order to measure maturity and develop action plans.		
Project configuration			
Project requirements			
Project industrial launching			

A K E Y R E A S

Figure 1. Project Maturity Model

In this step of our research, we are defining, structuring and applying the five levels of maturity for each area. At this point we are not able to describe it because of confidentiality constraint.

4. CONCLUSION AND FURTHER WORK

Project management maturity models have been used very successfully to guide process improvement. However, due to the dynamics of an automobile project, its use keeps complex and it needs a long time period to achieve a level of maturity. So, the purpose of this study is to develop a model to measure maturity project in order to have a best project control and monitoring. With the use of this model, project managers will be able to have a different vision of project advance that could be reflected in better decision making.

Project control procedures are primarily intended to identify deviations from the project plan and they don't take into account the maturity of projects. In evaluating schedule progress, it is important to bear in mind that the accomplishment of some activities are related to the level of maturity that project have achieved. Most project control and scheduling systems do not provide many aids for such updating.

The final objective of this research is to allow projects managers controlling and monitoring projects not only with scorecards or reporting tools but using maturity project models and maturity indicators in order to increase project performance.

Further work will be the creation of key maturity indicators (KMI) as an evaluation component of each process areas.

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