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Summary.

In the early stages of a project it is important to start with the definition of the way of working that will result in the Work Plan for the project. This plan is naturally being checked as it advances in its development process and the team fulfills each of the tasks. As a result of this activity, it will be possible to have a set of elements that make up the process to be used in the project. Depending on the characteristics of each one and its environment, the elements of the process that are considered necessary to allow its fulfillment will be chosen. The implementation of good practices for the correct preparation and management of work plans in projects that helps the UEB Multimedia of the Information Technologies and Advanced Telematic Services Company CITMATEL to migrate from the current state to a desired state aligning the use of information technology (IT) and business requirements.

Key Words: Project plans, Software development, Good practices.

1. Introduction

Software is one of the pillars of modern society, whether for work, business or pleasure. Both children and adults have a strong dependence on technology that is based on robust and robust software applications and services. This dependency is based on the assurance that software applications and utilities are safe and reliable. From the other perspective, the software development industry evolves very quickly, given the demand and opportunities offered by the market in the form of unmet needs. There is a lot of competition as many companies are trying to develop their own solutions to achieve better results but unfortunately, many efforts are not taken into account in software development. Various industry sources point out that approximately 80% of software projects are unsuccessful due to poor forecasts, highly improvable project executions, limited budgets and resources, or inappropriate functionalities.

To ensure that a software product is of adequate quality it is necessary to carry out certain activities in a systematic way, this implies planning from the beginning of the project a plan to achieve the objectives set in relation to it and prevent delays. In the world, there are good practice guides for attracting human and business capital, among others, but not for the correct implementation of a project plan that helps project management and planning. This causes many companies to fail or many of their projects do so as indicated by statistics from (Standish Group International, 2015) (Standish Group 2015 Chaos Report - Q&A with Jennifer Lynch, nd) in which it shows that canceled projects reach 19 %, renegotiated projects are more than 50% and successful projects are below 30%.

Projects in the UEB are being affected by inadequate planning in project plans, this situation can be mitigated by actions aimed at improving the quality of planning supported in the construction processes of plans for software development, due to this, the objective of this research is to implement good practices for the execution of project plans that allow development to be organized efficiently and all tasks are carried out efficiently and effectively in order to have a high percentage of satisfactory projects and that the company is competitive against the others. There are several schools that try to standardize the concepts and practices associated with project management and promote the construction of project plans tailored to the needs of the projects. The Software Engineering Institute stands out in particular with its CMMI proposal (CMMI for Development - Implementation Guide | Mukund Chaudhary | Apress, sf), the Project Management Body of Knowledge (PMBOK) (PMBOK Guide | Project management Institute, sf), and the ISO 21500 standard developed by the International ISO Standards Organization (Pérez & Fernández, nd). These schools propose new techniques and in their recent versions have introduced the need for simulation techniques, data analysis and optimization of resources, but the following difficulties appear:

- They do not propose specific optimization techniques for the construction of project schedules.
- They explain the need to consider resource availability constraints, but do not take into account constraints related to human resource competencies.
- On the other hand, the classic techniques for planning PERT and CPM projects do not explicitly consider the allocation of resources to tasks, but rather are tools to help graph and analyze schedules once they have been built.

The project plan is the foundation on which it is created. Without a solid framework, it will be very complicated, the project will not get off to a good start or finish as planned. Therefore, it is developed on a tight schedule to deliver each project on time and without exceeding the budget. A project plan for project management should be divided into more detailed parts. Needing to specify each one of them before starting with the development:

- Stages of the project.
- Activities list.
- Chores.
- Duration and time.
- Budget.
- Project team.
- Progress.

The context of this research is organized as follows, in section 2 of the article a study of the state of the art of the problem is carried out. Section 3 presents the design of a set of good practices that report better results in the proposed scenario. In section 4 the results of the investigation are analyzed and finally the conclusions of the work are presented.

2. Analysis of good practices for the execution of project plans

In this article, a bibliographic review of the most internationally recognized schools, models and standards is carried out, with the aim of analyzing the elements and good practices that should be considered for successful project management and planning in the CITMATEL UEB Multimedia. A comparison is made between the studied models using a set of questions that validate the presence of some project planning elements. The result obtained in the research constitutes a starting point for the description of a guide of good practices for the execution of project plans in the UEB.

Theoretical and empirical research methods were used to support the development of the research. Within the theoretical methods, the Analytical - Synthetic was used, to analyze the theories and official documents related to project management in environments dedicated to software development. The Logical Historical method was used in the analysis of the trajectory of the UEB Multimedia in the processes of carrying out the project plans. The Documentary Analysis was also used as an empirical method, through which it was possible to analyze the models, norms and standards of greater reference at the national and international level, which made it possible to reach accurate conclusions about the object of study and make a comparison between them.

Project management began to strengthen a few years ago. Starting in the 1960s, companies understood the advantages of organizing work in the form of projects. In the 5th edition of the PMBOK (2013) a project is defined as: temporary effort that is carried out to create a unique product, service or result. The temporary nature of projects implies that a project has a definite beginning and end. The end is reached when the objectives of the project are achieved, when the project is terminated because its objectives will not be met or cannot be met, or when the need that gave rise to the project no longer exists. (PMI, 2013).

In today's market there are maturity models, standards, methodologies and guides that can help an organization dedicated to software development to improve the definition and implementation of its processes, which has a positive impact on the management and quality of solutions. Among the most outstanding project management schools are: PMI, SEI, ISO; and associated with these are the PMBOK reference models, CMMI and the ISO 21500 standard. For the development of the research, a bibliographic review of four of the international standards for planning project plans in project management was carried out.

The Project Management Institute (PMI) develops, promotes, and distributes the Project Management Body of Knowledge. Knowledge, PMBOK) considering it as a fundamental reference in the field of Project Management.

The PMBOK Guide identifies a set of fundamentals for project management generally recognized as good practices, specifying that these do not mean that the knowledge described should be applied in the same way in all projects; the organization and / or the project management team are responsible for establishing what is appropriate for each specific

project. (PMI, 2013). In the PMBOK the processes are grouped into five categories: Initiation Process Group, Planning Process Group, Execution Process Group, Group of Monitoring and Control Processes, Group of Closing Processes. Each of these groups has a set of specific processes (47 in total) that ensure the success of the project's objectives.

The Software Engineering Institute (SEI, 2013) is an American federal research and development institute, founded by the United States Congress, in Pittsburgh, in 1984 to develop evaluation and improvement models in software development. This institute carried out the development of the CMMI model. CMMI best practices are published in three documents called "templates", which are directed to the areas of Development, Procurement and Services. CMMI for Development proposes five levels of maturity, distributed between: 1- Initial, 2- Managed, 3- Defined, 4- Managed quantitatively and 5- Optimized. The model grants level 1 by default for each organization that wishes to obtain a certification of this type. (Abelardo, 2015). CMMI is made up of 22 process areas, distributed in the five levels and organized into four fundamental groups: Process Management, Project Management, Engineering and Support. In this analysis, the Project Management group stands out. The 7 process areas of CMMI-DEV Project Management are the following: Integrated Project Management (IPM), Project Monitoring and Control (PMC), Project Planning (PP), Quantitative Project Management (QPM), Management Requirements (REQM), Risk Management (RSKM), Supplier Agreements Management (SAM). (Institute, 2010) These in turn are classified as basic areas or advanced areas of Project Management. The advanced process areas of Project Management address activities such as establishing a defined process that is adapted from the set of standard processes of the organization, establishing the project work environment from the standards of the organization's work environment, coordinate and collaborate with relevant stakeholders, create project management teams, quantitatively manage the project and manage risks. It is designed to provide the best fit for the needs of the project.

Establishing the IPM process area provides a higher level for planning, performing, and improving project tasks and activities. Defined process management is based on the additional insight provided by understanding the interrelationships of process activities and detailed measurements of the process, its work products, and its services. To achieve this, it defines the need to manage the project using integrated plans, where the monitoring and follow-up of each of its work products and components is a vital activity to ensure that the product meets the outlined specifications.

ISO 21500 published in Spanish as standard UNE-ISO 21500 Guidelines for the direction and Management of

Projects (AENOR, 2013), aims to serve as guidance when directing projects, promoting good practices within this discipline. ISO 21500 identifies the direction and management processes grouped by Subject Groups

(Integration, Stakeholder, Scope, Resource, Time, Cost, Risk, Quality, Acquisitions, Communication) that allow the distribution and management of the relevant information of the project, establishing inputs and outputs. ISO 21500 defines a set of templates as a guide to use to display the information and a guide to facilitate the understanding of it

by each subject group. However, it does not develop applicable tools and techniques, which is why it constitutes a standard and does not meet the requirements and demands on tools and techniques to be used.

The ISO 21500 standard is structured in two different ways: by the nature of its processes, and by its correlation over time. The first attribute groups the processes by Subject Groups, and the second “Groups of Processes”. (ISO 21500, 2013). Subject Groups include processes that pertain to specific specialties, require specific techniques, and can be performed by independent entities. In addition, their tasks are usually repetitive, cyclical and ordered sequentially according to the rhythm set by the Project. The "Groups of Processes" bring together processes with which they have a temporal affinity, grouped by Stages, with a defined beginning and end, chained in a series where the completion of one group gives way to the next. The Process Groups are divided into five: Start, Planning, Execution, Control and Shutdown. The Integration subject has as processes: develop project minutes (Start), develop project plan (Planning), work execution (Execution), work control and change control (Control). In the Closing group, establish the phase or project closure and generate lessons learned.

Since its creation, the UEB Multimedia of the Citmatel company has been dedicated to the production of Software, inserting itself little by little in the commercialization of its products in their different formats. The UEB did not have a suitable environment for software development, correct engineering techniques were not used, and efforts were undermined by the lack of planning in project plans and their monitoring is not carried out efficiently. A continuous improvement process must be created by applying good practices defining a set of activities, processes, artifacts and technologies that make it possible to define a correct project plan for the execution of projects.

The planning of project plans is currently insufficient in the UEB, since there is no efficient automated tool that manages the activities defined to be developed, affecting the balance of the factors time, cost and satisfactory result.

An analysis was performed on the software development reports and the following results were obtained:

In the period 2015 and the first semester of 2018:

- 38% of the projects being executed were delayed and 5% stopped.
- 78.5% of the production centers presented at least 1 overdue project
- 60% of the projects being executed were delayed and 3% stopped.
- 60.5% of the groups presented at least 1 overdue project.

In the second half of 2018 to the present:

- 46% of the projects being executed are overdue and 5% are stopped.
- 50.4% of the groups presented at least 1 overdue project.

In the analyzed reports it is specified that the problem that causes the most recurrence of deviations in the indicators time, cost and satisfactory results in the projects is given by the poor planning of the project plans and by the breaches of the interested parties that have been manifested in the period through:

- Delays in projects that sometimes lead to their arrest.

- Failure to carry out progress checks on projects.
- Delays in closing project development milestones.
- Delays in closing and accepting products.

Poor planning of project plans directly affects the success of projects, mainly due to the fact that the execution of the project plan is altered and the time and cost planned for its development can be modified. In relation to this, it is stated that there are problems with project delays and timely decision-making by immediate superiors when risks are activated or incidents are detected. The incidents that arise in software projects affect one or more of the indicators: time, cost, or risk, directly affecting the satisfactory result and successful completion of the project.

3. Analysis of results

Below is a summary table of the presence of some project planning elements selected to carry out a comparative analysis among the most recognized schools and detect deficiencies, or advantages in relation to the good practices they propose. Some questions oriented to project planning are made for them.

Table 1. Comparative analysis of project planning elements in the analyzed schools.

Items to compare	PMBOK	CMMI	ISO 21500
What is it?	Guide that regulates the direction of the project	Integration Model for Maturity Capability	Standard oriented to project management
Define artifact result of planning?	YES	YES	YES
Do you define roles that are involved in planning?	NOT	NOT	NOT
Do you propose to carry out analysis of deviations or incidents?	YES	YES	YES
Do you view team building as a planning activity?	YES	YES	YES
Do you define inputs and outputs for each proposed activity?	YES	YES	NOT
Do you propose planning project plans in a general plan?	YES	YES	YES
Do you propose specific optimization techniques for the construction of project schedules?	NOT	NOT	NOT
Do they explain the need to consider resource availability restrictions?	YES	YES	YES
Do you take into account constraints related to	NOT	NOT	NOT

human resource competencies?			
Do they take into account techniques and tools in the processes?	YES	NOT	NOT

The schools analyzed agree that the following aspects should be taken into account in the management of the project: carrying out the causal analysis of incidents or issues that affected the development of the project at some point, collecting experiences and lessons learned during the development of the project, integrate the project plans into a general plan and manage the participation of the relevant project stakeholders. CMMI and PMBOK define inputs and outputs for each activity proposed in the project plan carried out for the correct progress of the project.

It is considered that the models do not define roles that intervene in planning, nor do they propose specific optimization techniques for the construction of project schedules and do not take into account restrictions related to the competencies of human resources, this has an unfavorable influence on the process development of projects.

Most experienced project management professionals know that there is no single way to manage projects. They apply their knowledge and skills and implement the necessary project management processes in the order of their preference and with varying levels of rigor to achieve the expected performance of the project. However, the determination that a particular process is not necessary does not mean that it should not be considered, the manager and the project team must approach each process and the project environment to determine the level of implementation of each process within the project with correct planning in the project plan. It is being achieved that the ideas proposed by the governing organizations of project management converge into good practices, although it remains for the organizations to consider which model best suits the development characteristics of the organization to which it belongs.

To achieve correct planning, the need to manage the project is defined using project plans that respond to the standard processes of the organization. In relation to this, it is considered that the CMMI model covers and explains the integration of each plan to be developed and the critical factors that must be ensured for its correct integration, considering it as an important aspect in comparison with the rest of the schools analyzed.

Implementation proposal for UEB Multimedia according to the study of the models. For a correct software development process, the following good practices should be taken into account in the creation and implementation of project plans:

- Adequately analyze all the information related to the project to be implemented, this includes, in addition to the content, resources and people in charge.

- Select a tool or technique to optimize the plans and make the calculations more efficient: Rapid Tracking: a form of Duration Reduction where the schedule of a project is shortened by overlapping tasks that can be done simultaneously.
- Set specific objectives both internally (infrastructure improvement, process optimization, employee retention) and externally (benefits, market share, customer satisfaction).
- Define the stages of the project.
- Define success criteria to ensure that projects are delivered on time and on budget, that the final product meets a certain level of quality, and that it solves a specific business problem.
- Define the deliverables in as real time as possible.
- Take into account the requirements defined in the project profile.
- Define dates using a work breakdown structure to determine what is due and when.
- Identify risks, assumptions and limitations.
- Organize project members holding them accountable for each assigned task be it customer or stakeholders.
- List the resources that will be assigned to the project for its correct execution.

4. Conclusions

Through the development of this research, the following conclusions were reached regarding the object of study:

Project management is an integrative task that requires each product and project process to be properly aligned and connected with the other processes to facilitate coordination.

The establishment of a process that allows a correct planning and implementation of project plans in project management in the UEB Multimedia environment provides a higher level of planning, recognized not only by the model implemented in the organization but by other models that They regard this process as an advanced level of project management.

For the development and implementation of a correct project plan in the UEB it is recommended to have as fundamental activities those that are related, to achieve an efficient development process thus avoiding bad results.

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