EXPERIENCES OF SPANISH PUBLIC ADMINISTRATION IN REQUIREMENTS MANAGEMENT AND ACQUISITION MANAGEMENT PROCESSES

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Abstract: This paper shows the main contributions of the 1st Symposium on Improvement Process Models and Software Quality of Public Administrations. The obtained results expose the need to promote the implementation of Software Maturity Models and show possible advantages of its application in software processes of Public Administrations. Specifically, it was analyzed the current status in two process areas: Requirements Management and Subcontracting Management.

Keywords: Requirements engineering, subcontracting management, improvement models, process.

Introduction

In spite of the great advance in Information Technologies (IT) on the last years, we found that the majority of organizations, public or private, have the same problems in their software production process. These problems cause that:

- A software product is delivered, most of the time, with a 15% of defects.
- A fourth part of software projects are not finished or they are abandoned.
- A 30% or 45% of software resources are expensed in rewriting the software.
- Only the half of the times the plans and schedules established at the beginning are satisfied.

As an alternative to solve these problems, some of the research institutes of software engineering began the task to obtain and organize, in processes, the practices that are used to produce an maintain software and have demonstrated to be effective in some organizations.

For Software Engineering Institute (SEI) a process is a set of practices to perform and obtain a result, including tools, techniques, materials and people. This set of tools, techniques, materials and people is named "Software Process" [1]. The SEI has grouped the effective practices in references models.

A reference model is a set of processes that helps organizations to know their process status and is used as a guide to improve them. One of the most important improvement process models is the "Capability Maturity Model for Software (Sw-CMM)", developed by the SEI [2]. Actually, this model is recognized for its integrated version (Capability Maturity Model Integration, CMMI) [3], [4]. The purpose of CMMI is to provide a "road map" for process improvement that works as a framework to improve in an effective way. This "road map" will be a useful guideline to improve all processes (develop, acquisition and maintain of products and services). In the same way, the CMMI offers a structured framework to evaluate the organization's current process and establish priorities for the improvement task.

Motivation

The increasing use of the Internet and the continuous developing of new IT have changed the focus of Public Administrations to interest in improve the citizen attention process through continuous improving of their IT products. For this purpose, it is necessary that one of the system's fundamental components, like software,

satisfy the user requirements, it is characterized by its reliability and can assure the accomplishment of costs and schedule associated with his development.

In this context, the Madrid Community, through the Autonomous Organism of Informatics and Communications (ICM) with collaboration of the Polytechnic University of Madrid, organized the 1st Symposium on Improvement Process Models and Software Quality of Public Administrations, its objectives were:

1. Determine the progress in Improvement Process Models, CMMI specifically.
2. Identify the advantages of CMMI application to the software process of Public Administrations.
3. Make a quickly evaluation of current situation of Public Administrations in processes like Requirements Management (RM) and Subcontracting Management (SAM) using CMMI as reference model.
4. Obtain general conclusions to develop process improvement initiatives in any Public Administration.

The Symposium was organized in:

- Conferences. The Conferences purpose was to show the current trends of the Improvement Process Models, particularly the models developed by the SEI. Besides, experiences of CMMI implementation in public organisms and private enterprises were presented [1], [5] [6] [7].
- Focus Groups. The principal objective of the Focus Groups was to obtain a quick assessment of processes in the Public Administrations using the CMMI as reference model.
  The RM and SAM processes were discussed in different focus groups, having special attention in do not accept, in the same group, two or more participants of the same Public Administration.
  Each focus group was integrated with a maximum of ten participants. The discussion was managed by one moderator with the objective of getting current data (issues) related to the Public Administrations.
  Another objective of focus group was the benefits identification through the analysis of Public Administrations on improving their current processes by a CMMI implementation. The obtained result was a list of actions and recommendations of short term.
- Workshops. Finally, the Workshops were organized by the Symposium sponsors to present, in this way, the commercial offer with solutions for the implementation of improvement process models.
  The Symposium had an audience of 133 participants from three Ministerial, eleven Autonomous Communities and two Local Administrations. Besides, eleven private enterprises participated in the Symposium and they sponsored the event too.

Requirements Management Group

The focus groups have one moderator. The moderator gave a brief introduction about concepts and practices of CMMI RM Process. After this, the moderator addressed the discussion with the objective that the Public Administrations expose their current situation.

To continue, the specific practices (SP) of CMMI RM Process are described. A brief description and the obtained findings are included.

- SP1.1. Develop an understanding with the requirements providers on the meaning of the requirements.
  Description. Establish the need of identifying the requirements providers to get the same understanding for each requirement and obtain the expected reliability.
  Findings. It was found that there are multiple providers for the Public Administrations. It is true that most of the time these providers could be identified by their name, but the communication process is informal, it means that do not exist any documentation to identify all requirements providers. Usually, the requirements are communicated in a horizontal way to the top level.

- SP1.2. Obtain commitment to the requirements from the project participants.

  Description. Determine the impact of agreed requirements with the project participants negotiating and registering the established agreements.

  Findings. Almost all of the participants in this group determined that they do not have defined processes for establish agreements with all requirements providers. The agreements are made orally through work meetings.

- SP1.3. Manage changes to the requirements as they evolve during the project.

  Description. Establish that the requirements and their associated changes must be managed from the beginning and during life cycle, in a manual way or using and automatic tool.

  Findings. A great number of Public Administration does not have a process for change management or, in a better case, they have a poor process but they do not document their changes. This is a weak point identified by the evaluation. In another hand, the participants found that it is too difficult manage the changes because sometimes the requirements providers are not aware of the impact generated by a change.

- SP1.4. Maintain bidirectional traceability among the requirements, project plans and the work products, from their source to a lower level.

  Description. This practice, called traceability, establishes the need of make a detailed and continuous tracking of each system requirement through the life cycle.

  Findings. On first place the participant had confusion with the "traceability" concept. This aspect exposed the lack of knowledge because it was the first time that they heard the word. In another hand, we found that many Public Administrations do not perform traceability practices and they do not use a traceability matrix for their requirements. Only some of them perform a poor change management process. We confirmed this practice as a weak point in the RM process in Public Administrations.

- SP1.5. Identify inconsistencies between the project plans and work products and the requirements.

  Description. This specific practice finds the inconsistencies between the requirements and the project plans and work products and initiates the corrective action to fix them.

  Findings. It was determined that the Public Administrations do not perform the revision of their projects plans, activities or work products for consistency with the requirements. For this reason, this practice was identified as a weak point too.

By the end, the "process institutionalization" to ensure that the process will be documented, effective, repeatable and lasting, is a long term objective. The Public Administration confirmed the use of one or two previous practices, but an institutionalized practice is a concept out of their hands in this moment.

Proposals of Short-term Actions on Requirements Management Process in Public Administrations

All the participants of focus groups identified the need of having an effective, repeatable and lasting RM process to obtain reliable and controllable requirements. They identified the following short-term actions:
- Involve all organization in the improvement project, mainly the top level.
- Promote training initiatives among the personal of RM process.
- Sensitize Senior Management of Public Administrations with the importance of having an effective, repeatable and lasting RM process, and the benefits that this process brings to the software development process.

- Make that users understand the cost that any change implies and the importance of a proper requirements definition process at the beginning of a development.

- Monitor the requirements through traceability techniques and promote the tools acquisition for easy implementation.

- Develop a list of the most common terms used in Requirements Engineering to avoid confusions.

- Develop a guideline of RM practices to obtain a successful process in future projects.

Conclusions about RM process in Public Administrations

The Focus Groups promoted the participation of Public Administration and they expressed their current issues. Also, with the ideas and concepts expressed in the Conferences, each participant made the assessment of their own RM process using the CMMI as reference model. The Public Administrations identified the gap that they have with respect to the model. Although it is true that each one of the Public Administrations has a RM process, the opportunity to compare it with a reference model helped them to identify their deficiencies and what they have to do to improve their RM process. In addition, all Public Administrations agreed the importance of having procedures that allow them to repeat the successes for every new project.

Subcontracting Management Group

The Acquisition Process is defined as the process of acquiring partially or totally the Information System (IS) Technologies from an external services supplier [8]. It means to delegate everything or part of the IT work through a contract with an external company that joins in the client organizational strategy and seeks to design a solution to existing informatics problems inside the latter. In the last years, the SAM process of IT functions has been gained the attention of many researchers and industries.

To continue, the two specific goals (SG) of CMMI SAM Process are described. A brief description and the obtained findings are included.

- SG1. Establish supplier agreements.

   Description. Determine the product to acquire and identify and select the suppliers that better adapt to the organization needs. The agreements must be established by a formal contract.

   Findings. The Public Administrations usually call for proposals to subcontract their projects. However, this context is made with a certain level of mistrust giving the budgets exceed, the lack of communication, and mainly, the loss of project control. One of the main issues was the poor knowledge before the signing of the acquisition contract, losing then the capacity of negotiation. Here arose the idea of "subcontracting with responsible supervision". The real problem appears in the supplier selection activity, at least in "big projects". Is the Regional Government who select the provider and it does not consider the selection criteria and procedures of Public Administrations.

- SG2. Satisfy supplier agreements.

   Description. Agreements with the suppliers are satisfied by both the project and the supplier.

   Findings. The Public Administrations have a subcontracting process (efficient or not, but they have it) but they do not have a monitoring and control process for lead the subcontracting project. This loss of control can be due to the lack of knowledge about subcontracting standards and models within the organizations. One of the mentioned alternatives was the use of subcontracting strategies; establishing process to accomplish the goals and design the strategy and control for the required service.

Proposals of Short-term Actions on Acquisition Management Process in Public Administrations

The participants exposed the following short-term actions:

- It is necessary to subcontract in a rational way, trying that the Public Administration maintains the strategy and functional analysis of project.

- The Public Administrations should have a deep knowledge about the product that they want to acquire: "If I do not have the knowledge, I do not know what we want to subcontract".

- Never forget that the subcontracting process does not avoid the work, generates new: monitoring and control the acquisition.

- Both parts (client and provider) must have clearly objectives and they must follow and efficient methodology to all levels (top level, functional, and more).

Conclusions about SAM Process in Public Administrations

The Public Administrations have certain mechanisms that lead the SAM process, usually they plan the project without metrics and they do not have monitoring process.

The lack of project control can be due to the lack of knowledge about subcontracting standards and procedures in the organizations.

It is important to mention that the Public Administrations have not known how to exploit the existing resources. A solution proposed by participants was not to imply in big projects or in its defect they can apply the "divide and conquer" theory. On this way, they would have many small projects that, by experience, are easy to monitor and control in an effective way.

We conclude that the Public Administrations use some model of effective practices, like Spanish methodology called METRICA3, to cover partially the SAM process. But their processes are not aligned with CMMI necessarily.

Conclusions

Before the Symposium on Improvement Process Models and Software Quality of Public Administrations, we invited to the General Administration of the State and 17 Autonomous Communities. With the purpose to make an extensive invitation, the Spanish Federation of Municipals and Provinces (FEMP) participated in the invitation visits.

In these visits we detect a poor knowledge on Improvement Models but we identify an increasing interest for participate in the Symposium discussions. Finally, three State Administrations, eleven Autonomous Administrations and two Local Administrations participated.

This represents a great advance, giving the poor knowledge and initial skepticism. We made a discussion forum to study and debate how the organizations could improve their current process, and to meet the recent studies on improvements models and their applicability in Public Administrations around the world.

With the assessment of Public Administration, in RM and SAM process specifically, we exposed the lack of control in these processes. This detection of "organization's weakness" promoted the organization's initiatives to begin an improvement process.

With these results, we accomplished the Symposium objectives. Firstly we obtain an initial assessment of RM and SAM processes of all Public Administrations and secondly we promote, among all Symposium participants, the idea that it is possible to improve and obtain the leadership in Public Administrations.

This Symposium was the first step, now it is the turn of Public Administrations, they should begin the formal assessment of their process to identify the strengths and weakness, and prioritize their improvements actions.

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