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PROJECT MANAGEMENT MATURITY MODEL: THE CASE IN AN AUTOMOTIVE INDUSTRY IN BRAZIL

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ABSTRACT

This study discusses the theoretical concepts related to project management, specifically on the measurement of its implementation, through the concepts of maturity models. Moreover, in order to confirm the theoretical concepts related, it will be presented the results of a survey data conducted in an automotive industry in Brazil (Rio de Janeiro state), through the research of maturity proposed by Darci Prado. This survey will demonstrate the perception of employees at the different areas on the project maturity in this organization. In addition, the result found revealed that the organization analyzed is at the levels observed and calculated, considering the average level of maturity of the region and country. It is concluded that the Brazilian methodology adopted was effective in terms of measuring the level of maturity in a Brazilian organization. It is estimated that this work can contribute to those organizations concerned in the application of project management and that these practices become entrenched and fully disseminated and becoming part of their culture.

Keywords: Project Management, Maturity Model, Maturity Level, Automotive industry, *Modelo de Maturidade Prado* (MMGP - Prado Maturity Model).

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1. INTRODUCTION

The theme of project management is increasingly attracting attention in the business and academic circles for providing practices that aim to contribute to the approach of organizational problems in a systematic way. The knowledge generated in the project management can serve as good practice, considering that the application of skills, tools and techniques resulting therefrom, promote a greater chance of reaching the objectives expected in the organizational projects. Projects are one of the means that allow organizations to reach results (González *et al*, 2007; PMI, 2013).

According to King (1993), more and more projects tend to grow in terms of importance to organizations, and the more aligned they are in business, the more vain they will be in the competition. In this way, a strong tendency of organizations to invest more in this powerful set of techniques and tools of project management and in the search of the best professionals in the area, with the purpose of increasing their knowledge and skills.

However, Kerzner (2017) considers that managing projects goes beyond adopting the knowledge, skills, tools and techniques usually applied. The results of the simple use of project management, without control or standardization, can be represented by a succession of errors and failures. That leads the organization to go through a slow and hard learning process through the actions of its own mistakes, without considering the learning experienced by other companies.

Projects involve a variety of human, financial and technical variables that influence Project success. With respect Project success, technical systems, behavioral systems, more competent and mature people should be considered, contributing to the Project's maturity, remembering that corporate Project practices create context for Individual Project practices and produce individual Project performance that, collectively, add up to corporate capability and/or performance. Every aspect of project management has two dimensions: a technical and a human dimension. The technical dimension encompasses those groups of practices or processes that are integral to project management, while the human dimension includes, not only the people who are operating these processes, but also their expertise (Cookie-Daves, 2002, 2003; González *et al*, 2007).

The profile of the organization should also be analyzed. In this sense, the article by Andersen *et* Jessen (2003, p. 461) states the following: "each organization has to look at its own results and find out where the organization has a great deal to gain in terms of increased project maturity".

Thus, organizations must carry out their own internal growth by identifying their weaknesses, measuring their level of efficiency and effectiveness of applied project management methodology, in order to capture the level of maturity in which they find themselves. The Project Management Maturity Model (PMMM) is a formal tool developed and used to measure an organization's project management maturity (Patel *et al*., 2016).

2. LITERATURE REVIEW

2.1 Project Management

According to the Project Management Institute or PMI (2013, p. 2), project is a "temporary effort undertaken to create a unique product, service or result". For Vargas (2016), projects have some main characteristics, such as: being-out-of-work routine; having logic in terms of event execution, which should include beginning, middle and end; clearly defined goals, being led by people; and rely on the use of resources and parameters.

However, it is questioned whether project management practices are more the fads of modern management that have led many organizations to join, in order to achieve their goals. The fact is that project management does not suggest anything new nor does it promise miracles. According to Vargas (2016, p.4), "its proposal is to establish a structured and logical process to deal with events that are characterized by novelty, complexity and environmental dynamics".

Research shows that 75% of its members indicated that there is a tendency that their companies will give more and more importance to the management of projects (PMI, 2009).

Thus, project management is comprehensive, since it can be implemented regardless of the purpose or size of the organization. The PMI (2013) cites numerous examples of projects, such as: development of a new product, service or result; changes in structure, processes, personnel or organizational style; development or acquisition of an information system; conducting research; construction of a building, industrial plant or infrastructure; implementation, improvement or enhancement of existing business processes and procedures and, as a goal of this work; develop a model for implementing a recyclable waste management program for an educational institution.

In order to meet these requirements, organizations currently have various project management methodologies available, such as the Prince 2, International Project Management Association (IPMA), Scrum and the Project Management Body of Knowledge (PMBOK Guide), each with a specific application.

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Kerzner (2017) states that, despite the importance of defining a project management methodology, it does not guarantee its success in terms of performance during its execution.

Using guides or adapting them to the reality of the organization, the fact is that the actions needed within the organizational context are usually implemented through projects based on a chosen methodology.

In this way, it is possible to verify in the figure below, that standardized practices promote projects with better performances. That is, the greater the standardized practices, the greater the chances of the projects to end on time and within budget (PMI, 2009).

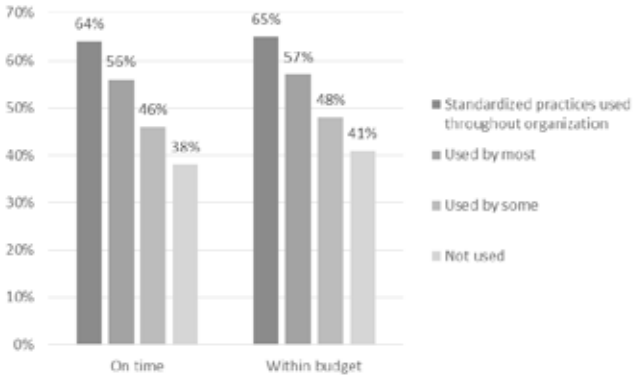

Figure 1. Standardized PM Practices and Better Project Performance
Source: Adapted from PMI (2009)

Because of this, Costa *et* Ramos (2013) find that organizations need to mature in the science and art of project management in order to coordinate efforts to deliver projects directed to the organization's strategy.

2.2 Project Maturity

There are several definitions for project maturity. According to the PMI (2013), organizational maturity in project management can be defined as the degree to which the organization practices the organizational management of projects.

For Carvalho *et* Rabechini Junior (2005) and González *et al.* (2007), maturity is like a slow and gradual growth plan, which must be structured for the medium and long term and that research indicates that the higher the maturity, the better the schedule performance and ability for managing projects based on standard.

There are over 30 models serving the existing market. Many of them have appeared in the mid-1990s and they were more heavily influenced by the thinking of the project management profession (González *et al*, 2007). In order to measure their level of maturity, organizations have several models in the market, such as the Organizational Project Management Maturity Model (OPM3), Project Management Maturity Integration (PMMI), Capability Maturity Model (CMM)/ Capability Maturity Model Integration (CMMI), and the Brazilian model *Modelo de Maturidade Prado* (MMGP - Prado Maturity Model), focus of this work.

Using one of these models to measure maturity in project management can make organizations more competitive and more prepared for the challenges that the market is continually imposing. However, for Oliveira (2010), there is no consensus on the use of a specific model that can serve as a reference to identify the real maturity of a company. Each organization adopts the most appropriate model, according to its organizational profile.

The Organizational Project Management Maturity Model (OPM3) is proposed by the PMI and emerged in 1998, as presented in figure 2. According to PMI (2013), the purpose of this model is to incorporate the results of several researches on best practices in organizational processes of Portfolio Management, Programs and Projects and in processes of Project Management, Standardization, Measurement, Control and Continuous Improvement.

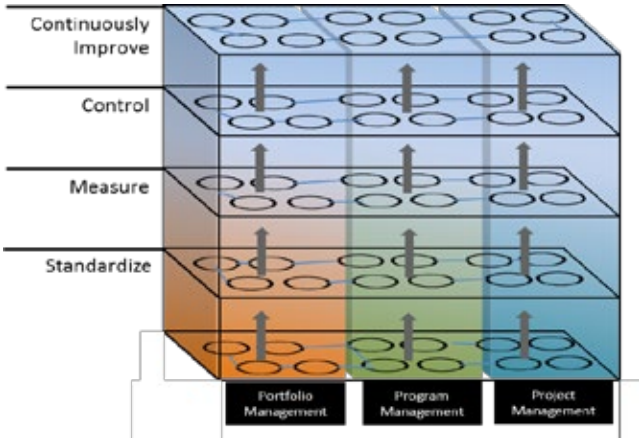

Figure 2. OPM3 Maturity Model
Source: Adapted from PMI (2013)

The Capability Maturity Model (CMM) emerged in 1987 with the purpose of evaluating the quality of the software developed by the organizations. Since 1991, there have been other CMMs directed to the different themes related more directly to IT. The Capability Maturity Model Integration (CMMI) was introduced to integrate CMMs. The purpose of the CMMI model is to provide guidance to improve the organization's processes and assist in the development, acquisition and maintenance of information technology products and services (SEI, 2006). Based on the CMM model, the

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CMMI model presents 5 levels: initial, managed, defined, quantitatively managed and optimizing.

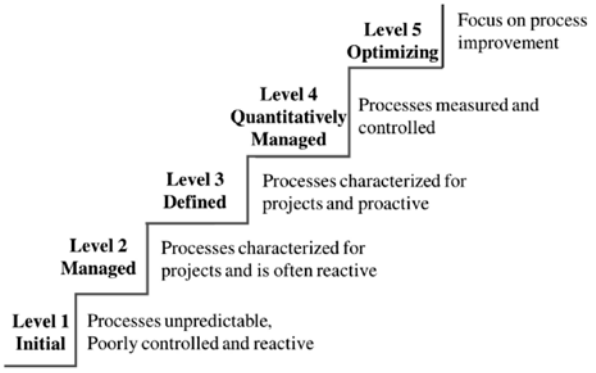

Figure 3. CMMI Maturity Model
Source: Adapted from Departamento de Produção (Poli et Shenhar, 2003)

The Project Management Maturity Integration (PMMI) was created in 2001 by Harold Kerzner to improve performance in strategic planning for project management. Like the other models, it also consists of five levels: common language, common processes, singular methodology, benchmarking and continuous improvement.

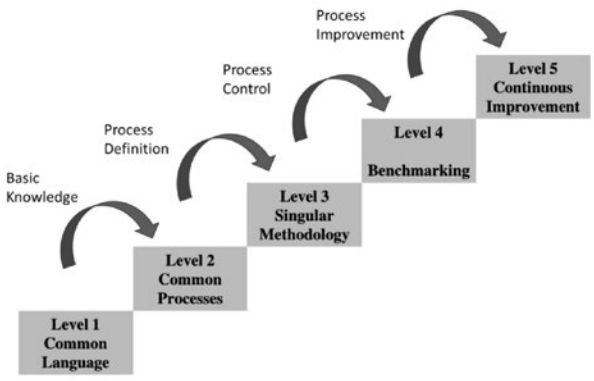

Figure 4. PMMI Maturity Model
Source: Adapted from Kerzner (2017)

The *Modelo de Maturidade Prado* (MMGP - Prado Maturity Model) model, proposed by Darci Prado in 2002 and 2004, suggested, like the other models, to evaluate the maturity of an organization. The focus of this work will be given in this model, since its application form and results are widely available for use by organizations.

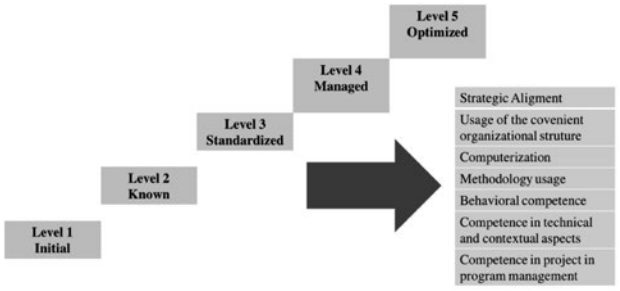

Figure 5. MMGP Maturity Model
Source: Prado (2015)

The model presents five levels of maturity: initial, known, standardized, managed and optimized. For each of the five levels of the project management maturity, the model presents seven dimensions of maturity: strategic alignment, usage of the convenient organizational structure, computerization, methodology usage, behavioral competence, competence in technical and contextual aspects, and competence in project and program management (Prado, 2015).

In order to use the MMGP model, it is necessary to apply it in each sector of an organization separately in order to verify that different perceptions of maturity levels can be found within the same organization.

Prado (2015) predicts seven dimensions that cross the stages of maturity in his model.

1. Competence in Project and Program Management
2. Competence in Technical and Contextual Aspects
3. Behavioral Competence
4. Methodology usage
5. Computerization
6. Usage of the convenient Organizational Structure
7. Strategic Alignment.

According to Prado (2015), the stages in which the organization is found happens in the following way, considering the seven dimensions mentioned above:

- Initial - in this first stage, project knowledge is dispersed; there is no defined methodology; it presents only isolated attempts of computerization; absence of organizational structure in projects; existent individual initiatives without strategic alignment. There is a high risk of delays, budget overruns and failure to meet technical specifications.

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- Knowledge - in the second stage of maturity; project knowledge is basic; the implementation of methodologies as isolated initiatives starts; it presents isolated attempts of computerization; there is a lack of organizational structure in projects; there is some progress in human relationships still without strategic alignment. Improvement is perceived from one stage to the next, but failures still persist.

- Standardized - at this stage, knowledge remains basic; however, it is perceived that the methodology, computerization and organization structure were implemented, since strategic alignment was started. At this time, it is possible to verify the management of multiple projects in a grouped and disciplined way, with a project office actively participating in the planning and control of projects.

- Managed - the fourth stage of maturity has advanced knowledge, with methodology, computerization and organizational structure stabilized. Personal relationships are harmonious and efficient, since there is a project management office acting as a center of excellence with autonomous project managers. At this stage, the projects are still strongly aligned with the organization's business.

- Optimized - the fifth and last stage of maturity is the moment of advanced knowledge, and methodology, computerization and organizational structure are quite optimized in it. The project team is mature and ready to take on even greater risks and they are ready for a new cycle of change as well.

This model has a questionnaire of its own to be applied with the different areas of the organization, containing questions grouped to the levels of maturity mentioned above, considering in its content the seven dimensions explained. This concept and the applied methodology will be better explained in the topic methodology and results of the present study.

3. METHODOLOGY

The type of research undertaken in this work was a quantitative and qualitative research, carried out through data survey, using the questionnaire developed by Darci Prado.

This data survey was performed in order to verify the current project management maturity in an automotive company located in Brazil. In this way, it would be possible to verify the level of maturity of this company and compare it to the average of the current market.

The methodology chosen among those presented in the chapter, referring to the theoretical reference, was Darci Prado's model. The choice of this model was mainly due to the ease of obtaining the methodology and its questionnaire and also due to the ease of access to results obtained from previous surveys conducted annually. It is worth mentioning that this model is a national product developed according to the organizational culture of this country.

The questionnaire used is version 1.6.5, extracted from www.maturityresearch.com. It is divided into four sections containing questions for the evaluation of levels 2, 3, 4 and 5. All questions have five options, ranging from: a) the situation proposed in the question in its literalness (the option varied according to the questionnaire approach); b) the existing situation is slightly lower than that presented in item A; c) the existing situation is significantly lower than that presented in item A; d) studies have been carried out in this direction and are being implemented and; e) there is no initiative in this direction. Level 5 has only two response options.

The options have the following calculation values:

A = 10 points

B = 7 points

C = 4 points

D = 2 points

E = 0 (zero) points.

The sample of application of this data survey was defined following non-probabilistic parameters, counting on 12 (twelve) participants from the areas of product planning (truck platform), product planning (bus platform), purchasing and quality.

The survey was conducted during 2014 and, in order to guarantee the quality of the respondents' responses, it was applied personally and individually so that research errors could be avoided, especially the "non-sample respondents". Thus, the researcher carried out the reading of the questionnaires with the interviewees and motivated them to answer them in a reliable way.

The data, which compose the text of this article, were tabulated in the excel software from which the answers were created.

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4. RESULTS

The average maturity level, resulting from the data collection performed in the organization studied, was 2,59 points. The calculation of this value is made from the formula:

Maturity Evaluation Formula = (100 + total points) / 100

According to a global report of 2014, conducted by Archibald & Prado Research (2015), available on the Maturity Site by Project Category Model, the average maturity level of the companies participating in the research in Brazil is 2,64. This level of maturity was calculated considering 415 professionals from private, public and third sector companies, counting on 7,885 projects. Figure 6 shows the percentages of these organizations distributed by maturity level.

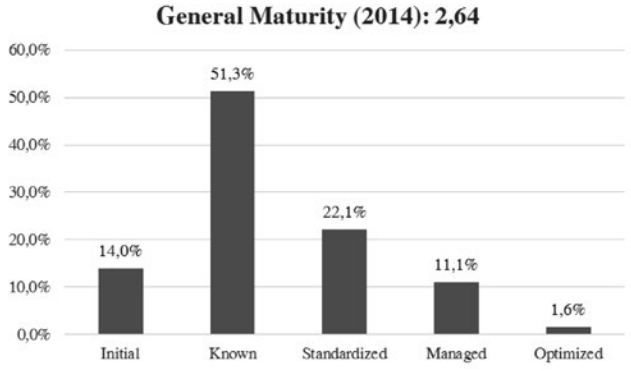

Figure 6. The average maturity level in Brazil
Source: Adapted from Archibald et Prado (2015)

The result of the data collection carried out by the researcher allows us to situate the organization at maturity level 2; in other words, when there are investments in software and training, and that isolated initiatives for standardization of procedures are identified, despite their restricted use.

Thus, although the organization studied is below the average of the survey of Archibald et Prado (2015), it can be said that it is within level 2, where there is a significant presence of organizations in general.

Considering the studied organization as part of private companies, in the category of development of new products & services and in the state of Rio de Janeiro, it is possible to analyze the stratification of this level from the research report of Archibald et Prado (2015).

Thus, according to the research report of Archiblad et Prado (2015), it can be verified that the level of maturity of private companies is 2.68. Within the category of development of new products and services, the level is 2.55. And in the state of Rio de Janeiro, the level is 2.04. Compared with the level of maturity obtained in the organization studied, it is found that it is below the general level of private companies; however, it is higher than the organizations belonging to the category of development of new products & services and the state of Rio de Janeiro.

However, according to figure 7, a discrepancy in terms of the view of the maturity level of projects of the organization by area is observed.

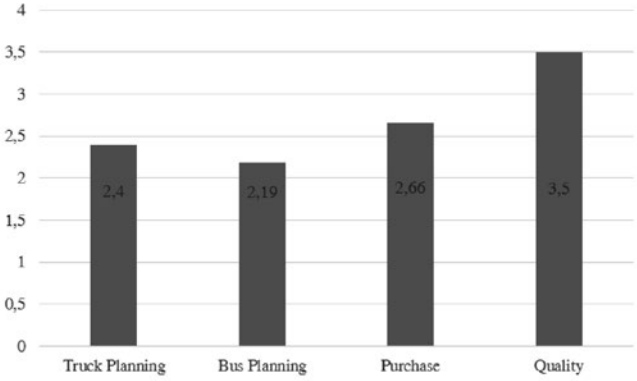

Figure 7. Maturity per area
Source: The Authors

Among the areas considered in this survey, the product planning (Platform Buses) was the one that most demanded and considered the management maturity of this organization with less notice, followed by product planning (Platform Trucks).

It is worth noting that the difference in terms of punctuation does not only exist in areas with different fields of action. The data indicated that the same planning area perceives the level of differentiated maturity.

It is verified that the participants' perception of the quality area is that the level of maturity is in 3. In this way, it can be said that they consider it as standardized, diffused and used in the projects in this organization, unlike the other Areas.

In relation to the detail of the generated note, the figure 8 shows the level of maturity punctuated by the areas.

Figure 9 shows the differences in terms of the perception of the participants in the area of quality and planning, especially at the optimized and managed level.

The chart shows the average scores given by participants per question.

It can be seen, therefore, that the scores that obtained the highest points were the ones related to the level of con-

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textual knowledge or the area of the business by the management team (2.4), related to the evaluation meetings of the progress of each project made by the manager of the Project with his team (3.8) and related to the technical planning of the product or service being developed by the project manager (3.10).

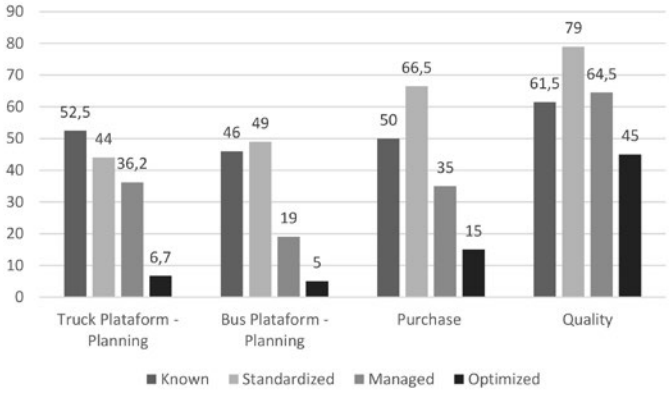

Figure 8. Note per area
Source: The Authors

On the other hand, the lowest scores are mainly related to the optimized level. It is concluded that there are currently no lessons learned practices (5.2), visibility of the organization to the business community regarding the practice of project management (5.4), certifications such as PMP, IPMA or equivalent of project managers (5.7), (5.8) and appropriate computerization throughout the project lifecycle (5.9).

5. CONCLUSIONS

It must be said that consolidating a management culture is a challenge for all organizations concerned with improving the efficiency and effectiveness of their projects. Complementing this concept, measuring the maturity of the organization becomes fundamental for the organization to know its stage, recognizing its strengths and weaknesses in order to direct its strategies to be able to take advantage of the opportunities of improvement that the market has.

The present study concluded that the positioning of this organization located in the state of Rio de Janeiro is at a level of regular adherence. This means that the company currently has a common language with basic and timely training with key project stakeholders.

It is also important that the descending and ascending levels are considered, since the organization may present some specific traits of these different levels. Therefore, it is stated that, although this organization is positioned at level 2, as indicated by the data collection carried out, this company presents methodology developed, implemented and tested, also counting on an organizational structure. It can be said that these are characteristics of level 3, present in this company as well. However, it also presents, in some situations, typical characteristics of the initial stage level, such as budget overruns and deadlines.

Another important conclusion observed in the data collection was the difference of perception between the areas, as predicted by Prado (2015).

The company is currently in a moment of maintaining the leadership in the sector and the areas are very loaded with work within this context, which made it impossible to use a larger sample in this study. Due to this limitation, it was not possible to obtain comprehensive conclusions on the subject. For this reason, the study was called a data survey and not a survey itself.

As an immediate action, it is recommended that this company implements lessons learned from projects and more strongly supports the training of its project managers, focusing on the certifications currently recognized in the market, seeking to engage in communities focused on management practices of projects and computerizing their processes to the maximum.

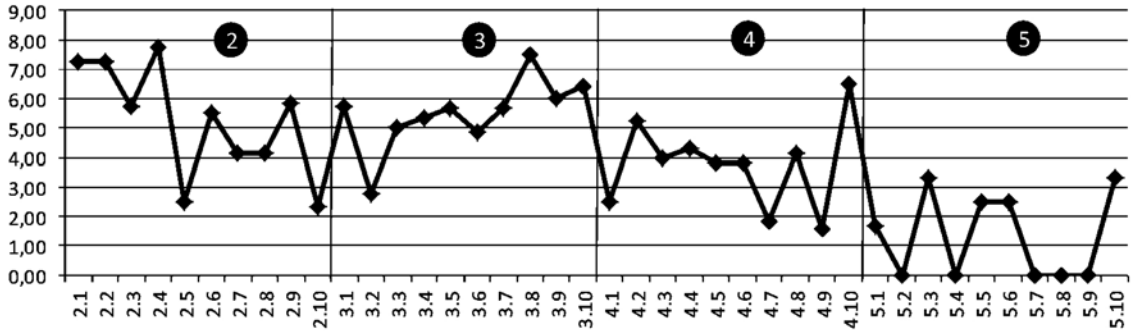

Figure 9. note per question
Source: The Authors

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However, it can be said that the organization studied is concerned and is willing to improve the management of projects with a dedicated team and with dedicated, involved and active project managers. This company is on the long road to maturity and that every action in the way of an optimized organization increases its competitive advantage each day in order to maintain its leadership in the market.

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