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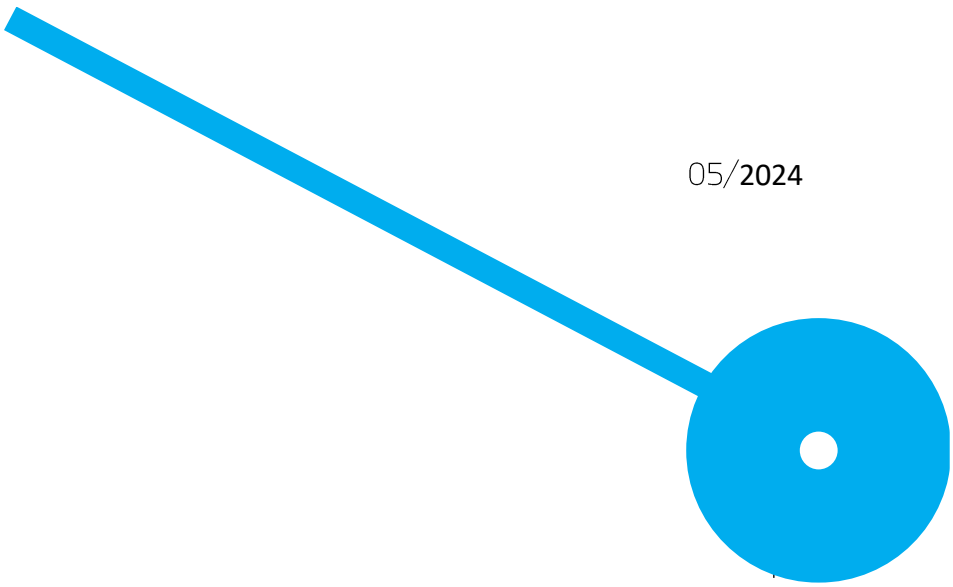
Analysis of the Maturity of Information Systems Projects in the Portuguese Public Healthcare Institutions

José Miguel Rocha Nunes



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Analysis of the Maturity of Information Systems Projects in the Portuguese Public Healthcare Institutions

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Professor José Ângelo Pinto

Dissertation submitted in fulfilment of the requirements for the Master's degree in Project Management in the School of Management and Technology of the Polytechnic of Porto.

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"The Happiness of your life depends on the quality of your thoughts." – Marcus Aurelius

Resumo

As dificuldades enfrentadas pelo setor de saúde em Portugal, como as longas listas de espera, a falta de mão de obra qualificada e o fraco investimento, entre outros, destacam a importância de compreender as causas desses problemas. No ambiente empresarial atual, o desenvolvimento de sistemas de informação é crucial para alcançar um bom desempenho. Posto isto, é importante dar especial atenção a projetos relacionados com esta área.

Esta pesquisa comporta 4 objetivos, analisar a maturidade na gestão de projetos de sistemas de informação no setor público de saúde português; analisar, caso exista, a correlação entre o nível de gestão de projetos e a região, norte e sul, onde estão inseridas as instituições de saúde; comparar os níveis obtidos neste estudo com os níveis obtidos noutros estudos, nacionais e internacionais; e, por fim, propor algumas boas práticas com o intuito de melhorar o nível de maturidade dos projetos de sistemas de informação no setor da saúde.

Através de uma revisão de literatura e através do questionário enviado às Instituições de saúde, foi possível chegar à conclusão que a maturidade dos projetos de sistemas de informação no setor público de saúde em Portugal, é de nível 2. Relativamente ao fator região, foi possível concluir que não tem uma significante relevância no nível de maturidade de gestão de projetos. Relativamente ao terceiro objetivo, não foi possível fazer qualquer comparação, uma vez que não foram encontrados estudos nacional e internacionalmente, dentro do âmbito desta dissertação. Por fim, foram propostas boas práticas dentro das áreas de competência de gestão de projetos e programas, competências técnicas e contextuais e competências comportamentais; uso metodológico; computorização; alinhamento estratégico; e estrutura organizacional.

Apesar das conclusões obtidas, existem limitações associadas a esta dissertação como uma baixa representatividade da amostragem com uma taxa de 56% de respostas obtidas; a aplicação de apenas um modelo de maturidade, sendo que a aplicação de mais modelos poderia levar a uma abordagem mais fundamentada. Esta avaliação tem como base fundamentos teóricos e nenhuma das boas práticas propostas foi testada e, portanto, não tem uma validação de aplicabilidade.

Para futuras pesquisas, pretende-se a aplicabilidade de outros modelos de maturidade para uma maior precisão na abordagem de reformas adotada. A aplicabilidade

prática das propostas dadas neste estudo é um objetivo pretendido, com o intuito de validar a eficiência e eficácia das práticas propostas.

Palavras-chave: Saúde; Sistemas de Informação; Modelos de Maturidade; Gestão de Projetos; Setor Público.

Abstract

The difficulties faced by the Portuguese healthcare sector, as long waitlists, lack of skilled labor and poor investment, among others, highlight the importance of understanding the root causes of these problems. In today's business environment, information systems development is crucial for achieving good performance. Therefore, it is important to give special attention to projects related to this area.

This research encompasses four objectives: to assess the project management maturity level of the information systems projects in public healthcare institutions in Portugal; to understand, if it exists, the correlation between the project management maturity levels founded and the regions, north and south of the healthcare institutions; to compare the levels found with other research explored in the literature nationally and internationally; and to propose a set of good practices focusing on improving maturity in project management with a view to refining results and services provided in the health sector.

Through a literature review and a survey sent to health institutions, it was concluded that the maturity of information systems projects in the public health sector in Portugal is at level 2. Regarding the region factor, it was concluded that it does not have significant relevance to the level of project management maturity. As for the third objective, it was not possible to make any comparison since no national or international studies within the scope of this dissertation were found. Finally, best practices were proposed in the areas project and program management competence, technical and contextual competence, and behavioral competence; methodology usage; computerization; strategic alignment; and organizational structure.

Despite the conclusions obtained, there are limitations associated with this dissertation, such as low sample representativeness with a 56% response rate; the use of only one maturity model, whereas applying multiple models could lead to a more substantiated approach. This evaluation is based on theoretical foundations, and none of the proposed best practices have been tested, therefore they lack applicability validation.

For future research, the application of other maturity models is intended to achieve greater precision in the approach to adopted reforms. The practical applicability of the

proposals given in this study is a desired objective, aiming to validate the efficiency and effectiveness of the proposed practices.

Keywords: Healthcare; Information Systems; Maturity Models; Project Management; Public Sector.

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Abbreviations

BR – Brasilian

CRIS – Clinical Research Information System

EHRs – Eletronic Health Records

GDPR – General data protection Regulation

HIS – Hospital Information System

HISs – Health Information Systems

HMSs – Healthcare Monitoring Systems

IS/IT as Information Systems Information Technology

ISD – Information Systems Development

KPIs – Key Performance Indicators

LHS – Learning Health System

PHRs – Personal Health Records

PM – Project Management

PMBOK – Project Management Body of Knowledge

PMI - Project Management Institute

PMMM – Project Management Maturity Model

PMO - Project Management Office

PT - Portuguese

SPSS – Statistical Package for the Social Sciences

US – United States

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1. Introduction

1.1. Presentation and Opportunity of the Theme

Between 2009 and 2015, Portugal was troubled by an economic and social crisis, which resulted in a reduction of funds allocated towards the healthcare sector and this precipitated a diminution in the quantity and quality of healthcare services and a reduction in the allotment of resources towards public sector within the National Health Service (Nunes & Ferreira, 2019).

The healthcare sector is facing challenges in meeting the needs of the population in a timely and efficient manner (Ferreira et al., 2018). According to (Vaughn et al., 2019), this is due to 5 factors: (1) Poor organizational culture, (2) Inadequate infrastructure, (3) Lack of a cohesive mission and vision, (4) System shocks and (5) Dysfunctional external relations. This research deepens throughout the inadequate infrastructure, more specifically, technological infrastructure.

In today's digital age, information systems play a crucial role in the functioning of businesses and organizational institutions, and they are an essential tool in understanding and managing the complexity of digital environments (Park & Mithas, 2020). In a dynamic and challenging environment as the technological field, it is crucial to be capable to improve Information Systems (IS) infrastructure in order to survive and differentiate from other companies (Varajão et al., 2021). To facilitate the constant improvement of the Information Systems, companies has been recuring to Project Management (PM) (Varajão et al., 2021) and according to Gomes and Romão (2015), project management is a fundamental tool for the development of Information Systems initiatives and its use increases the probability of success of those projects.

The assessment of the project management maturity level, provides insight into the current proficiency and it serves as a starting point, aiding in the identification of specific capabilities, skills, and knowledge areas that require improvement (Archibald & Prado, 2014a).

1.2. Main Goals

The purpose of this dissertation is to assess the maturity level of information systems project management in the Portuguese public healthcare institutions.

Given the importance of this theme and the status of the health sector in Portugal, there are four goals that were stablished in addition to the purpose of this research regarding the project management maturity level of the development of information systems in Portuguese healthcare Institutions:

1. To assess the project management maturity level of the information systems projects in public healthcare institutions in Portugal.
2. To understand, if it exists, the correlation between the project management maturity levels founded and the regions, north and south of the healthcare institutions.
3. To compare the levels found with other research explored in the literature nationally and internationally.
4. To propose a set of good practices focusing on improving maturity in project management with a view to refining results and services provided in the health sector.

1.3. Innovative contributions

The research aims to contribute to a more in-depth understanding of the project management maturity level of information systems development projects in healthcare institutions and to provide insights for practitioners and researchers in the field. Additionally, this research will also provide healthcare institutions with a benchmark to assess their own information systems development maturity level and to identify the areas of improvement.

This investigation intends to understand the current state of the Portuguese health sector and of its development projects on information systems, and to suggest a process to improve the maturity levels in this sector. The study will also gather information on the application of the Project Management Maturity Model (PMMM) model by Darci Prado, with a

focus on analyzing the maturity levels of healthcare institutions, based on a literature review on these topics, a survey, and its analysis.

2. Research Methodology

As for data collection, a survey was conducted. This method was chosen based on the recommendation of Darci Prado, the author of the Maturity Model used in this research.

The elaboration of this survey questionnaire was based on the proposed model of maturity analysis by Darci Prado's PMMM. Using version 2.3.1. as a reference, some changes were made in order to better align with European Portuguese and to the scope of this research. The adapted survey was created using Google Forms, which after revised and verified from specialists, changes were made.

The total number of health institutions and their main information were obtained from a governmental and NHS website. In June 2023, an email with the attached survey was sent to every public healthcare institution, requesting the head of the IS department to answer it. Over the three months the survey was available, follow-up phone calls and email reminders were sent to increase the response rate.

The final version of the survey is available for consultation in Appendices A and B at the end of this dissertation, in Portuguese and English, respectively.

3. Literature review

3.1. Healthcare Sector

The National Health Service in Portugal provides universal and comprehensive healthcare to all citizens delivering healthcare services, including primary care, hospitals and specialized care across the country and it is funded by government and payroll (Nunes & Ferreira, 2019).

After a stretch of weak economic growth, Portugal faced a big financial crisis starting in 2008, leading to a tough time in 2009 (Perelman et al., 2015). In response, the government asked the European Union (EU) for help, but this came with austerity, strict rules to cut spending and increase taxes (de Almeida Simoes et al., 2017). Around the same time, there were changes in the healthcare system to save money and though these changes aimed to

make things run better, the budget cuts made it hard to provide good and quick healthcare services (de Almeida Simoes et al., 2017). Consequently, healthcare access turned uneven in Portugal, causing more health problems for some people (de Almeida Simoes et al., 2017; Nunes and Ferreira, 2019). de Almeida Simoes et al. (2017) identified two additional factors contributing to the challenges faced by the public health sector: centralization and the regulatory bureaucratic structure deeply rooted in Portugal's political and cultural context.

The healthcare sector is a complex and uncertain field, and there are difficulties in obtaining and using information, which leads to market failure in meeting the needs of the population (Smith, 1997).

For Smith (1997), there are some features that distinguish the Healthcare service system from normal markets:

- Universal access – In most countries, it is considered essential to guarantee medical and care services, especially in an affordable and sustainable way. However, this is a goal that is not always secured, even in the most developed countries.
- Complexity and uncertainty – The benefit that an individual can get from healthcare depends on various and complex factors such as the knowledge of the healthcare professionals, infrastructures quality and the healthcare institution's capacity. The preferences of the individuals can also depend on their health status. Such random fluctuation makes it harder to predict and to operate.
- Information difficulties – There's not much information given to the citizens about the range and effectiveness of the treatments. There is also not enough market research on the part of the healthcare institutions since insurance institutions find it difficult to understand whether services are being provided according to the customers' preferences. Although it may be possible to overcome information difficulties once there's regulation that forbids the costs of collecting and validating a suitable information system.
- Market Failure – This feature is a consequence of Complexity and uncertainty and of Information difficulties, which results in the mechanisms failing in operating efficiently. The absence of knowledge and information specialists will result in too much control

and responsibilities by the doctors, who will be responsible for the demand. The structures will be centralized, and the scope will be skewed.

- Technological Progress – The developments in medical technology is in a constant and quick evolution.
- Changes in demand – As expectations rise and the population ages, the demand appears to be rising, independently of technological progress and advances.

There's a difference between projects in private and public sectors, more specifically, between institutions with profit goals, and institutions with non-profit ones, in which the expected outcomes may not be similar in projects between these two types of institutions (Santos et al., 2014). Santos et al. (2014) outline those public institutions, in particular, focusing on preventing diseases, promoting health, and prolonging lifetime among the population.

Both Healthcare organizations and government bodies are increasingly recognizing that challenges in effectively managing healthcare processes are originated from technological infrastructure limitations and management inefficiencies (Carvalho et al., 2016).

3.2. Information Systems

3.2.1. Information Systems

For Carvalho et al. (2019), Information Systems (IS) and Information Technology (IT) infrastructures form the foundation of all hospitals and other healthcare institutions. This highlights the crucial significance of these infrastructural components.

Park and Mithas (2020) affirm Information Systems are an aggregation of important data that are used to understand and theorize the complexity of digital environments including analysing "systematic patterns of high performance across different economic sectors".

3.2.2. Health Information Systems

According to Sembay et al. (2023), Health Information Systems (HISs) are instrumental tools for collecting, processing, communicating, and utilizing critical information. They play a pivotal role in delivering efficient and effective healthcare services by enhancing management from administration to clinical decision support systems (Sembay et al., 2023).

Sembay et al. (2023) identified the main HISs that help to improve the provided services by these institutions, allowing the patient's information to be computerized:

- Electronic Health Records (EHRs).
- Personal Health Records (PHRs).
- The Learning Health System (LHS).
- Healthcare Monitoring Systems (HMSs).
- The Clinical Research Information System (CRIS).
- The Hospital Information System (HIS).

As referred before, the difficulties that the healthcare systems have been through are verified from the limitations of the technological infrastructures (Carvalho et al., 2016).

As (Heeks & Ospina, 2019) refer, the information systems brough high potential to improve the functioning of health care organizations, although, the health care information systems need to be successfully developed and implemented.

By developing a well-defined strategy, establishing a suitable governance system, streamlining processes, and assembling a capable team, it becomes feasible to fully leverage the potential of existing technology (Gomes & Romão, 2018).

To support the ongoing enhancement of Information Systems, companies have been turning to project management (Varajão et al., 2021).

3.3. Project Management

3.3.1. Project management

Organizations often use project management to execute projects effectively and efficiently, such as improving products and services, reform systems, and change work methodologies (PMI, 2021).

This dissertation focuses on Information Systems development projects and not operations. With that being said, it's essential to know in what project consists of. Once a project can be in any area whatsoever, the Project Management Body of Knowledge (PMBOK)

Guide focused on defining a Project by its characteristics and limits instead of its application (PMI, 2021):

- Unique product, service, or result – projects are initiated to achieve objectives by delivering a unique product, service, or result.
- Temporary endeavor – projects are characterized as temporary endeavors, signifying a clear start date and conclusion to the project.
- Projects drive change – projects act as agents of change within organizations. From a business perspective, a project is designed to shift an organization from one state to another, in order to achieve a specific goal.
- Projects enable business value creation – projects empower the creation of business value, a quantifiable benefit from a business.
- Project Initiation Context – organizational leaders react to external factors, by creating projects that can help companies in that environment.

There are certain attributes that should be considered as acquired, and these attributes have a direct impact on the success of a project according to Schwalbe, K. and Furlong, D. (2017):

- Quality is a pivotal concern: health projects are primarily developed to address or prevent a specific health issue, with many being associated with matters of survival.
- The government plays a central role: the state is frequently the project funder or the driving force behind the development of a health project.
- Perspectives on health are highly personal: individuals exhibit different behaviors, willingness to pay for healthcare, and preferences for the types of services they use.

In order to manage projects successfully, project managers must recognize that certain factors are essential for a project's success and Tempfer and Nowak (2011) identified the following success factors:

- Adequate financing.
- Partnerships.
- Advanced project logistics.
- Smal scale projects.
- Adequate internal and external communication.

When it comes to the definition of the term "success", it can be concluded that it has a wide range of definitions and is perceived differently by various stakeholders, making it challenging to determine or define precisely. As suggested by Meredith and Mantel (2006), what may seem like a failure in one project could be considered a success factor in another.

Cook-Davis (2002) and Dooley et al. (2000) have a similar definition for different terms. For Cook-Davis (2002), there are differences between project success and project management success as he refers to project success as the achievement of project objectives, and to project management success as measured by cost, time, and quality wise. According to Dooley et al. (2001), the success of a project is usually evaluated in terms of its timeline and quality, in terms of deliverables, among other factors and the more knowledgeable an organization becomes on these issues, the less likely it is that there will be fluctuations during execution. This process of acquiring knowledge on the success factors is referred to as maturity (Dooley et al., 2001).

It is necessary to take into consideration the differences between private and public organizations in which there's a non-profit and profit goals, respectively, in order to understand the nature of public projects goals (Santos et al., 2014). Public institutions, in particular, prioritize disease prevention, health promotion, and extending the lifespan of the population, and this intangibility of most results and impact is a challenge (Santos et al., 2014).

In the healthcare sector, a project is acknowledged as an especially valuable approach to introducing innovations, addressing emerging challenges, or identifying solutions for issues that existing procedures and routines may not effectively address and for that, there are different types of projects as Santos et al. (2014) refer:

- Research projects, designed to enhance knowledge that can serve as a foundation for making "evidence-based" decisions.
- Development projects which involve creating and pre-testing an intervention to address a specific issue within a particular population or target group.
- Implementation projects which focus on disseminating and implementing an existing intervention within a specific target group or population.

As referred before, the healthcare sector is complex, unpredictable, and uncertain (Smith, 1997). Agile methods have been suggested as a solution for this kind of unstable environment and in addition these methods complement the iterative approach to Information Systems Development (ISD) (Hummel, 2014).

3.3.1. Agile Methodologies

The intricate and extensive legal regulations governing project procurement, as well as the complexity of technological systems within public entities, are pivotal factors that obstruct the effective utilization of agile methodologies in project management within the public sector (Ribeiro & Domingues, 2018).

As per Parker and Bradley (2000), the organizational culture prevalent in the public sector often tends to be highly hierarchical, characterized by stringent rules and politics, minimal flexibility, and a strong emphasis on formal, communication-oriented documentation, factors that collectively pose significant challenges in effectively implementing agile methodologies within any public organization.

Notable research by Pikkarainen et al. (2007); Conforto et al. (2014), underscore the importance for further investigation into the impacts of agile methodologies within the public sector. More research would equip the public health sector with valuable insights to enhance their readiness for implementing projects using agile methodologies (Ribeiro & Domingues, 2018).

Despite the difficulties, a study performed in Seville University by Torrecilla-Salinas et al. (2013), showed that the application of an agile methodology in a public organization had a

great impact. It was used project management techniques such as scope, time, and cost management and in almost all cases these projections were achieved (Ribeiro & Domingues, 2018).

In a study performed by Ribeiro and Domingues (2018), it could be concluded that even though there was initial reluctance to adopt agile methodology in the health sector, the outcomes proved to be favorable. This study suggests that having a standardized software development approach, which is currently lacking, is vital and implementing such a method would enhance performance and it proved well-suited for this sector (Ribeiro & Domingues, 2018).

Kerzner, (2019) says that project management is currently more than just a career-path position, is a competency necessary for a long-term survival and its maturity will increase the probability of excellence.

Kasser and Williams (1998) highlight poor organizational maturity in project management as a critical factor influencing the underperformance of Information Systems and Technology (IS/IT) projects.

3.4. Maturity Models

3.4.1. Maturity Models

It is acknowledged that technical knowledge, although vital, are insufficient for establishing and sustaining a robust "Project Management System" without continuous improvements in other aspects such as Project Management methodologies, the information system, organizational structure, and competencies (Fraticelli et al., 2014). Moreover, assessing whether top corporate executives are aware of their organization's current maturity level is imperative (Fraticelli et al., 2014).

Archibald and Prado (2014a) emphasize the importance of a good maturity measurement and analysis. The maturity models help to identify which capabilities, skills and knowledge areas to improve and also presents with a benchmarking so that a company, department or a workflow/process can be compared to others. Studies show that increasing Project maturity impacts positively in selecting, planning, and executing its projects and this consequently impacts positively in the enterprise.

For Carvalho et al. (2019), maturity models, aiding decision-makers in enhancing healthcare systems and enabling substantial organizational, procedural, and clinical changes, hold significant value.

According to Campos et al. (2020), maturity is linked to the ability to achieve maximum development. When applied to an organization, the state of maturity signifies a condition where it is perfectly poised to attain its objectives.

As per Hartono et al. (2019), maturity reflects to what extent a particular organization is capable of fully utilizing consistent processes in one or more business areas. This means maturity in project management implies that the organization is perfectly conditioned to handle its projects.

According to Prado (2010) a maturity model is a tool that can numerically quantify the ability to successfully manage a project.

Maturity models serve as tools to streamline organizational management, encompassing the management of its information systems function (Carvalho et al., 2016). These models operate on the principle that individuals, organizations, functional domains, processes, and so forth, progress through a developmental and growth-oriented journey, advancing through various stages of maturity (Carvalho et al., 2016).

The fundamental idea encapsulated in maturity is that well-established organizations carry out tasks systematically, whereas less developed organizations achieve their goals through the extraordinary efforts of individuals who use improvised and self-generated approaches (Liu et al., 2011). A hospital with a mature IS infrastructure is likely to exhibit a greater level of formalization in its IS planning and control processes (Waring, 2015).

Considering the varied definitions, hundreds of maturity models have been created and developed, with the goal of measuring the level of project management maturity no matter what area or projects are in Archibald and Prado (2014a). According to Archibald and Prado (2014a), the purposes of these models are to:

- Pinpoint areas that necessitate improvement.
- Enhance both the selection and execution of the enterprise's programs and projects.

- Conduct a benchmark analysis of either an entire enterprise or a specific division within an enterprise, comparing it to competitors or counterparts in terms of key program and project categories relevant to that particular business entity.

In order to evaluate the state of public Healthcare sector in Portugal, regarding Information Systems Project Management, the selected model was *PMMM* by Darci Prado. This model was based on the experience of consultant Darci Prado in *IBM*, a tech company (Prado, 2010).

It can be observed the flexibility and transversality of this Maturity Model, once it enables the assessment and benchmarking of project management capabilities in private companies, non-profit entities, and governmental organizations, whether under direct or indirect administration (Archibald & Prado, 2014a).

The Prado's PMM Model is freely available for use by any organization worldwide seeking to assess and enhance their project management capabilities and according to Archibald and Prado (2014a) it aids in identifying areas for improvement and benchmarking against similar organizations across multiple countries, also against private health institutions in the same country, Portugal in this case. In terms of time, it is also one of the best models because its assessment process can take 60-90 minutes to implement.

The Prado-PMM Model should be utilized for specific departments within an organization, such as engineering, information technology, product development, and others. Therefore, it functions as a departmental model rather than an "organizational type model," with the emphasis on the specific department rather than the organization as a whole (Archibald & Prado, 2014b).

According to Archibald and Prado (2014b), using this model allowed carrying conclusions that showed that:

- There is a positive relationship between maturity and overall success.
- There is a negative relationship between maturity and failure.
- There is a negative relationship between maturity and delay.

- There is a negative relationship between maturity and overrun costs.
- There is a positive relationship between maturity and the perception, by senior management, of PM value addition.

Furthermore, and aligning with the referred characteristics, this model possesses the notable advantage of scalability, allowing an analysis of the entire organization, department, or even a specific function (Fraticelli et al., 2014).

As noted by Campos et al. (2020), the model was developed to prioritize practical experience and achieving outcomes, emphasizing simplicity in usability, the provision of reliable and strong results, and its correlation with a sector's competence in successfully executing projects.

3.4.2. PMM Model by Prado

As referred before, the model was designed to represent the level of proficiency in project management within a department (Archibald & Prado, 2014b).

Archibald and Prado (2014b) firmly believe that implementing an effective and adaptable management approach necessitates a strong foundation in solid and reliable principles. The principles referred by Archibald and Prado (2014b) are outlined below:

1. Existence and use of best practices for Project Management.
2. Eliminating the causes of anomalies.
3. Continuous Improvement.
4. Continuous technological and processes innovation.
5. Sustainability.

According to Prado (2010), this model is composed of three components:

- A questionnaire with 40 questions.
- Directives for implementing a diagnosis (simplified or in detail).
- Directives for a growth plan.

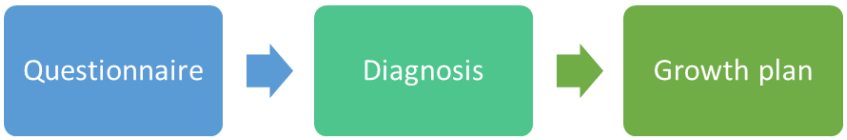

Figure 1: Prado – PMMM, Components of the Maturity Model. Source: Adapted from Prado D. (2010)

This maturity model should be able to help in the growth plan as it gives an idea of the maturity status of the company (Prado, 2010). For Prado (2010) higher maturity results in shorter deadlines, greater flexibility to price alteration, and delivery of expected outcomes. So, this means that the company will be able to deliver projects on time and with the expected results.

In this analysis of the Maturity of the Information Systems Projects, the questionnaire was adapted to the Information Systems department of public healthcare Institutions and its projects. After that a diagnosis was made taking in count the levels of the questionnaire and finally a set of good practices for a growth plan was proposed.

Each model of maturity has its own criteria and scales to define the maturity level of the analyzed object and this model consists of five maturity levels and measures across seven dimensions (*Figure 2*) (Archibald & Prado, 2014a).

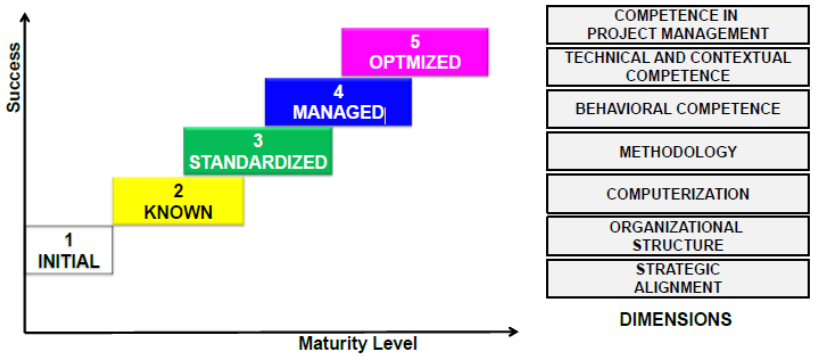

Figure 2: The Prado Project Management Maturity Model. Source: Archibald et. al (2014)

3.4.2.1. Dimensions

Archibald and Prado (2014b)

a. Project and Program Management Competence

The members responsible for project management must be competent, encompassing both knowledge and experience in various aspects of project management. This proficiency should align with standards outlined in resources such as the Project Management Institute (PMI) PMBOK Guide. The specific level of competence required varies based on the role undertaken by each member.

b. Technical and Contextual Competence

The responsible members engaged in project management must be competent, encompassing both knowledge and experience, in the technical aspects of the product (whether it be a good, service, or result) as well as in various facets of the organization, including finance, its productive and distributive model, and its overall business framework. The specific level of competence required varies based on the role undertaken by each member.

c. Behavioral Competence:

The responsible members engaged in project management must be competent, combining both knowledge and experience, in behavioral aspects such as leadership, organization, motivation, negotiation, and others. The specific level of competence required varies based on the role undertaken by each member.

d. Methodology Usage

A fitting project management methodology should encompass the entire life cycle that needs to be adhered to, including not only the Implementation phase, but also the previous Business Case phase.

e. Computerization

The relevant elements of the methodology should be computerized, and the system should be intuitive and user-friendly, enabling the correct decisions to be made at the appropriate times. Ultimately, the entire cycle, even the primary idea or need, should be computerized.

f. Strategic Alignment

The projects executed within the department should align seamlessly with the organization's strategies. The relevant processes, such as portfolio management, should be

carried out with both quality and necessary agility. The presence of computerized tools and a suitable organizational structure is essential.

g. Organizational Structure

An appropriate organizational structure is essential for the project across all the project stages. In the case of the Implementation stage, this structure typically includes project managers, Project Management Office (PMO), sponsors, and committees. The Organizational Structure should outline functions and rules, and also govern the distribution of authority and power among project managers and the various organizational areas involved in projects.

3.4.2.2. Maturity Levels

In terms of the five maturity levels, Archibald and Prado (2014b) make the following affirmative statements:

a. Level 1 – Initial

The organization lacks a precise understanding of projects and project management. Projects are typically carried out based on intuition, subjective goodwill, or the best efforts of individuals. Planning is generally lacking, and there is consistently a lack of control. Standardized procedures are not in place, and success is attributed to individual effort or luck.

b. Level 2 – Known, Isolated Initiatives

This stage signifies an initiation into the realm of project management. Its key characteristics include:

- Introductory knowledge of Project Management.
- Introductory use of tools (software) for activities sequencing.
- Isolated initiatives for planning and control of some projects.
- Each professional works in its own way, as the consequence of the lack of a standardized platform for PM, consisting of processes, tools, organizational structure, etc.
- Is the awakening of an awareness of the importance of implementing each of the components of a project management platform.

c. Level 3 – Standardized

This stage signifies the point at which a project management platform has been put into operation. Its principal attributes include:

- The existence of a standardized platform for PM.
- The platform has been in use by the leading players for over one year.
- Use of baseline and performance measurement.
- Data capture of anomalies that impact project results (delays, cost overruns, etc.).
- Evolution in skills.

d. Level 4 – Managed

This stage signifies the point at which a project management platform has been put into operation. Its principal attributes include:

- Elimination (or mitigation) of manageable anomalies that can obstruct project outcomes.
- Professionals consistently demonstrate a high level of competence.
- The results of the area (success rate, delay, etc.) are consistent with that expected for the maturity level 4.

e. Level 5 – Optimized

This stage embodies the scenario where the PM platform not only functions effectively and produces results but has also been fine-tuned through continuous improvement and advancements in technology and processes. Its primary characteristics are:

- Optimization of processes and tools.
- Optimization of results (time, cost, scope, quality, performance, etc.).
- Highest level of success.
- Efficiency in the environment and work climate, high productivity, and low stress.
- High recognition of the competence of the area, which is seen as a benchmark.

A comprehension of the dimensions and maturity level requirements makes it easier for the project manager to enhance the maturity level of information systems project management and Prado (2010), gives a few guidelines in this order.

This graphic is a result of several studies, but it's important to note that these are values that vary through the area of the project, and as we can see in the following image, the higher the maturity, the higher the success (Prado, 2010).

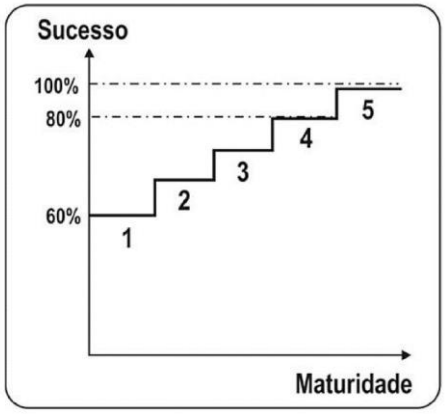

Figure 3: Maturity Levels and Success. Source: Prado D. (2010)

According to Prado (2010), as the maturity approaches level 5, the successful rate approaches 100% and to maturity level 4, the successful rate goes near 80%.

The projects have been gaining importance as they help the company in its strategies and if a company wants to initiate a project, it must firstly analyze the maturity level so that it can understand the probability of its success rate (Prado, 2010). If the maturity level is below 4, then there must be efforts so that can be an improvement and growth to attain level 4 and increases the success rate up to nearly 80% (Prado, 2010).

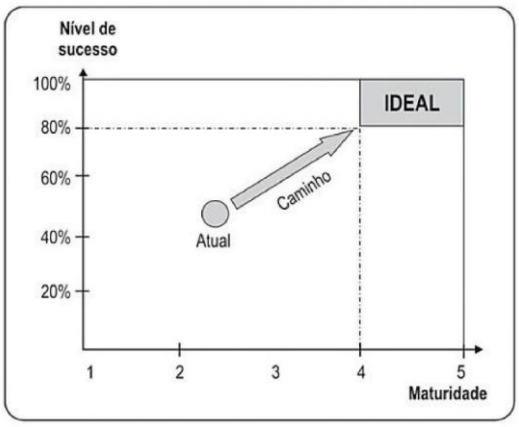

Figure 4: Evolution towards the ideal status. Source: Prado D. (2010)

As per Fraticelli et al. (2014), the organization has the discretion to determine if the attained level of maturity is acceptable and aligns with its requirements. If not, it should conduct a thorough analysis of its strengths, weaknesses, opportunities, and threats in Project Management (SWOT Analysis), which will aid in formulating an improvement plan in harmony with the main organizational strategy and business objectives (Fraticelli et al., 2014). Drawing from the experiences of various voluntary organizations that implemented the Prado model for improvement, three critical elements for achieving success in the improvement journey have been highlighted by Fraticelli et al. (2014):

- Keep the management committed.
- Plan and communicate widely.
- Be persistent.

In accordance with Fraticelli et al. (2014) the trends and data correlations discussed earlier can serve as a valuable tool for organizations to compare their own assessment results against the average performance observed in their specific industry or similar maturity contexts. If an organization identifies areas that require improvement, with the help of Prados' survey, it is crucial to adopt a structured approach to achieve a sustainable level of maturity over time.

To conclude, we observed that the Prado-PMMM model is underpinned by robust management principles, it's user-friendly and the interpretation of its outcomes is straightforward. The model has been successfully utilized in maturity surveys in Brazil since 2005, showcasing its credibility in evaluating maturity levels and facilitating the creation of pragmatic growth plans within organizational departments (Archibald & Prado, 2014b).

4. Obtained Levels among other studies in Portugal and Internationally

In delving into the examination of information systems project management maturity within public health institutions, it becomes evident that there exists a significant gap in the availability of comprehensive articles, particularly concerning Portugal and the broader European context. Despite the increasing reliance on technology to enhance healthcare

services, the literature seems to fall short in providing a robust foundation for evaluating the project management maturity of information systems in these critical sectors.

Although, the inaugural study on IS/IT project maturity in Portugal, led by Vilas Boas (2009), investigated project management maturity within the public administration sector. This examination involved the collective analysis of 37 organizations across 15 ministries. Notably, while the Health Ministry was included in the study, specific values for its individual project management maturity could not be discerned. Consequently, the study determined that the median IS project management maturity level among all these organizations was 1.6 in a range from 1 to 5 (Vilas Boas, 2009). However, the challenge of not isolating maturity values for the Health Ministry underscores a limitation in getting conclusions from the findings.

van de Wetering and Batenburg (2009) developed a Maturity Model that complement the IS project management maturity model as a specific model for a specific part of the Information Systems infrastructures, the Picture Archiving Communication Systems (PACS). However, it's important to note that the discussion of maturity levels in the context of this research extends beyond the limits of the study's scope.

Analysing 1222 responses to a survey applied to 4,500 short-term acute general medical/surgical and pediatric hospitals in the United States, Shortell et al. (2018) could conclude that close to 70% of hospitals reported the utilization of Lean, Lean combined with Six Sigma, or Robust Process Improvement as integral components of their strategies for transforming the care they provide to patients. Nevertheless, a mere 12.6% of hospitals that answered disclosed reaching a mature, hospital wide stage of implementation (Shortell et al., 2018). The level of maturity, coupled with factors such as leadership commitment, regular utilization of a daily management system, and effective training, demonstrated positive correlations with reported performance outcomes (Shortell et al., 2018). As a matter of maturity levels, there was no information that could lead to a comparison.

In a pioneering study conducted by Marsilio et al. (2022), this research stands out as one of the initial international benchmarking studies focused on Lean implementation within healthcare. Employing a standardized survey characterized by uniform definitions and questions, the study meticulously elucidates the multifaceted forms of Lean implementation across both strategic and operational dimensions, providing insights into associated perceived outcomes (Marsilio et al., 2022). This study informs on the benefits of agile methodologies in

healthcare but lacks in quantifying the maturity level of IS project management in healthcare institutions, a starting point for improvement.

In a comparison between United States (US) and Italian public institutions, Marsilio et al. (2022) concluded that despite the US reporting a higher proportion of public hospitals (53%) incorporating Lean compared to Italian public hospitals (36%), Italian hospitals attribute more achievements to Lean practices. Remarkably, 59% of Italian public hospitals have achieved the top two levels of maturity, surpassing the 44% reported by U.S. hospitals. This disparity results in a higher Maturity Level on Information Systems Project Management for Italian hospitals, showcasing the distinctive success and effectiveness of Lean implementation in the Italian healthcare context (Marsilio et al., 2022).

According to Mikalef and Batenburg (2011) conclusions, there are large differences between countries, with Scandinavian hospitals having high levels of IT adoption (Sweden, Finland, Norway) compared to hospitals from eastern and south European countries (Lithuania, Latvia, Greece). 834 hospitals across 18 European countries and a few determinants of a hospitals' IT maturity were studied and analysed, and Mikalef and Batenburg (2011) couldn't get to any conclusions on the reasons why the maturity levels on Scandinavian hospitals assume higher values when compared to South European Countries.

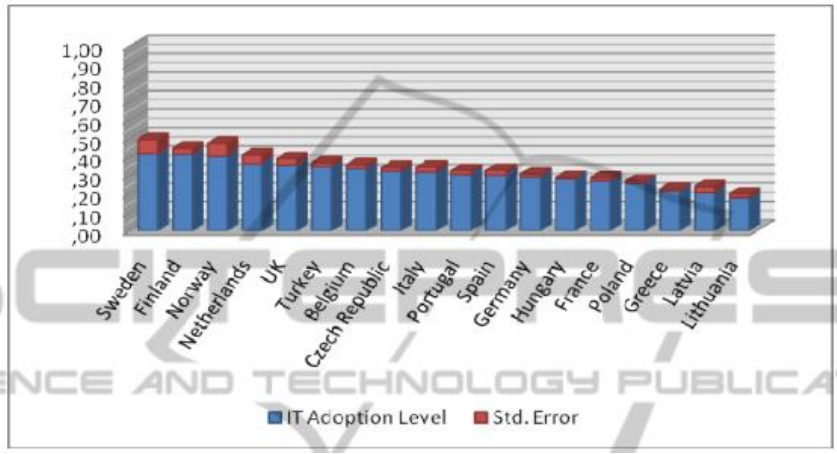

Figure 5: Adoption level of IT in hospitals by country. Source: Mikalef and Batenburg (2011)

Silva et al. (2014) analysed 19 institutions assessed with a maturity model, "The Organizational Project Management Maturity Model (OPM3®). This maturity model assesses

companies from 0% to 100% regarding their project management maturity level. The overall maturity results, as assessed by the OPM3® Score, underscore that the average maturity across the 19 organizations stands at 6,32%, with the most mature having a score of 31%, and unfortunately, a few others scoring 0% regarding its maturity. In conclusion, it is evident that the Procurement department emerges as the most mature area within these companies, while the Risk Management area lags behind as the least mature. OPM3® presents itself as a valuable opportunity for the Portuguese Industry, providing a foundational tool to enhance project management maturity levels and, by extension, overall performance (Silva et al., 2014). Silva et al. (2014) faced challenges in making comparisons and drawing overarching conclusions due to the absence of other studies addressing project management maturity.

To conclude, despite the growing reliance on technology in healthcare, the literature lacks a solid foundation for assessing project management maturity in these crucial sectors and no comparisons or conclusions can be achieved.

3.1. Quantitative Review – a Survey

As for data collection regarding maturity, it involved the use of a questionnaire survey. Questionnaires differ from surveys according to Baker and de Vaus (1986). Surveys have two key features: the data format and the data analysis method. These tools involve structured or systematic data, referred to here as a variable-by-case data grid. Explanatory surveys aim to explain the phenomena they discuss, while descriptive surveys collect information to describe a specific phenomenon (Baker & de Vaus, 1986). In this instance, an explanatory Survey was employed because the objective is to delve into the factors that underlie the maturity level of information systems projects within the public health sector in Portugal and provide a comprehensive understanding of the reasons behind it.

According to Hong et al. (2012), the survey-based approaches have significantly advanced our understanding of the studied topics.

3.1.1. The Survey

This specific maturity model was employed based on Prado (2010) recommendation in his work, Prado-MMGP Maturity Model version 2.3.1. (*https://maturityresearch.com*). Prado (2010) has developed a model specifically designed to measure project management maturity

across different project types. The selection of this model was also influenced by its notable contributions as it offers a concise and intuitive survey, delivers reliable and consistent results, and is universally applicable, making it suitable for diverse project types (Prado, 2010). Additionally, it effectively measures project-related aspects and serves as a foundation for a growth plan.

This survey was initially created in Brazilian Portuguese (PT/BR) by Prado (2010) but translated for usage in Portuguese institutions (PT/PT). The original survey consisted of 40 questions distributed between 4 levels and certain questions were adapted, added, or removed to better align with the specific context and the field of Information Systems Projects. The levels that include this questionnaire are, Known/Initiated; Standardized; Managed; and Optimized and as it progresses, the questions are about the presence of more mature project management practices.

This survey was designed using Google Forms and distributed to *48* public healthcare institutions, resulting in responses from a total of *27* of these institutions. The survey was initially sent to the institutional email, requesting its forwards delivery to the Information Technology department of the respective institution. In recent efforts to boost response rates, proactive measures were taken, including follow-up phone calls to remind recipients to complete the questionnaire.

The survey commences with a contextualization, outlining its purpose and scope, while also providing information on how the collected data will be handled to ensure compliance with the General Data Protection Regulation (GDPR). The first question is a Permission statement in which the respondent can quit the questionnaire. Going forward to the next question, the respondent needs to identify the healthcare institutions that works for. Subsequently, as previously mentioned, the survey proceeds to present questions pertaining to project management practices and knowledge, organized into four distinct sections. Within each section, the seven dimensions are examined in accordance with the respective level of maturity. Additionally, within the initial category labeled "Known," an additional question, question number 13, has been incorporated to assess the perceived significance and relevance of Information Systems to the healthcare sector, as well as their impact on the overall success rate of performance. A screening question was added to ensure data validation, in which all the answers were validated (question number 22).

Between level 2 and level 4 of the questionnaire, *Known* and *Managed*, respectively, the multiple-choice questions are constituted by five possible answers, between *a* and *e* in which *a* represent the highest level of maturity and *e* represents the lowest level of maturity regarding the respective question. In level 5, *Optimized*, there are only two possible answers, *a* and *e*, following the same criteria, in order to filtrate the most mature institutions and their practices. The last multiple-choice question, question number 42, is "Regarding the alignment of projects carried out in the sector with the organization's business (or strategic planning), select the most appropriate option:" with the available answers being "a. The alignment is 100%." or "e. The alignment is not 100%". The last question of the survey is for the respondents who selected "option e", in order to identify the percentage of the alignment regarding question number 42. This question has its relevance once that understands the synergy between the project management of the information systems and the organization strategic planning. This question will be analysed later in this dissertation. Each answer has a quotation that will be used to calculate the total score of each section and consequently with a final formula the overall project management maturity level:

- Option A: 10 points.
- Option B: 7 points.
- Option C: 4 points.
- Option D: 2 points.
- Option E: 0 points.

3.1.2. The Respondent

The respondents are professional workers in the IT department of public healthcare institutions in Portugal. Their age or other demographic characteristics are not considered relevant. The survey was distributed to the IT department of all public healthcare institutions in Portugal, whether it's internal or external, and anyone could answer as long as possessed pertinent knowledge and experience in the subject matter and have a comprehensive understanding of the current status of information systems projects within the institution they are serving. It was only requested an answer per institution.

3.2. Results Discussion

The importance and positive impact of project management on information systems departments are quite clear. Project management contributes by bringing preparation, organization, a focus on improvement, and a flexible work approach, all of which collectively enhance project efficiency and effectiveness (PMI, 2017).

3.2.1. Maturity Level

Insights derived from the literature review and the responses to question number 13 at level 2 of the survey, underscore the critical nature of Information Systems and the ongoing need for its enhancement. To the question "On a scale of 0 to 10, where 0 represents the lowest importance and 10 represents the highest importance, how important are information systems in the healthcare sector and its success?", the average response stands at 9,6, with 18 of the respondents rating the importance as a perfect 10, 7 respondents opting for a score of 9, and 2 respondents selecting an importance rating of 8, totaling the 27 answers to the survey.

Later on, as referred before, the respondents were asked "Regarding the alignment of projects carried out in the sector with the organization's business (or strategic planning), select the most appropriate option:", choosing between being 100% or not. Of the 27 answers, five respondents selected option a, being the alignment 100%. Of the remaining respondents, thirteen were able to identify a value, in which the mean is 58%. The nine remaining respondents weren't able to identify a value. These results indicate that there is still work to be done integrating Information Technology projects into the institution's strategic plan to align every department and foster synergy.

Concerning project management maturity levels, to enhance visibility into the adherence profile, as suggested by Prado (2010), it is advisable to categorize the scores into levels (Table 1). Within each section, the values of the answers are computed, and the mean is then calculated for each section. Analysing each level of the questionnaire, we can observe, as expected, that the score tends to decrease as we move to the next level. On a scale from 0 to 100, the average score is 45,3 in level 2, which then decreases to 42,9 in level 3. It further drops to an average of 28 in level 4, and eventually, it hits a low score of 11 in the highest level, level 5. This means that there's more adherence to project management practices evaluated between level 2 and 3, and very few to more mature practices evaluated as 4 and 5.

Level	Total Score	Adherence Profile									
		10	20	30	40	50	60	70	80	90	100
2	45.3										
3	42.9										
4	28										
5	11										

Table 1: Classification by Surveys' levels. Source: Own Elaboration based on Prado (2010)

According to Prado (2010), after that division, there's a formula applied for a final maturity score in which *Final Maturity Score = (100 + total_score) / 100* (See Attachment C). Based on the survey results, we observe that the maturity level of information systems projects in public healthcare institutions averages at 2,3, with most Health care institutions positioning themselves at level 2 and none at level 5. This illustrates a lack of implementation of project management measures and projects with a probability of success between 40% and 50%.

These results indicate the necessity of analysing maturity level 3 and its associated practices to establish the identified goal and formulate a strategic plan for its achievement.

3.2.2. Acknowledgment of the region as a factor

For this analysis, a statistical tool was used, SPSS (Statistical Package for the Social Sciences) and resorting to a Shapiro-Wilk test, the significance level for rejecting the null hypothesis was set at $\alpha \leq 0.05$.

It could be concluded that the projects exhibit higher maturity levels in the dimensions of Knowledge, Standardization, Optimization, and overall Maturity in the North Zone, and higher maturity levels in the Management dimension in the South Zone, although the differences are not statistically significant.

	North Zone		South Zone		
	M	SD	M	SD	Sig.
Knowledge	45,6	15,9	44,8	24,2	.920
Standardization	45,3	19,5	40,4	28,6	.611
Management	24,8	16,4	31,5	24,4	.410
Optimization	12,9	14,9	10,0	18,7	.402
Knowledge	128,6	50,8	126,7	84,6	.944

Table 2: Comparison by region. Source: Own Elaboration on SPSS

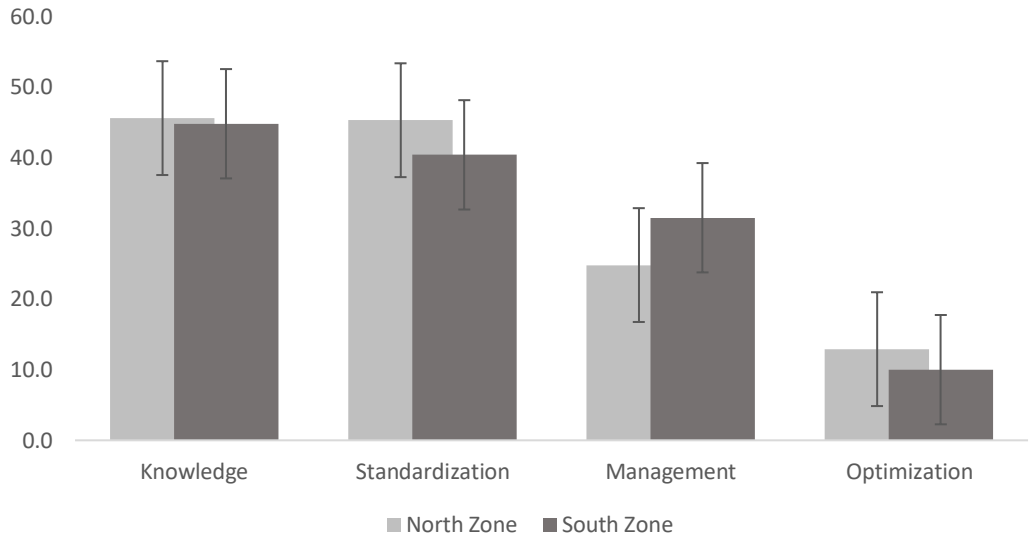

Figure 6: Comparison by region. Source: Own Elaboration on SPSS

3.2.3. Descriptive analysis

	a	b	c	d	e
LEVEL 2 - KNOWLEDGE (Common Language) – Isolated Initiatives					
3. Regarding the acceptance of the subject "Project Management" by department's senior management (i.e., the senior managers who have some influence on the projects)	55,6%	14,8%	11,1%	11,1%	7,4%
4. Regarding the acceptance of the subject "Project Management" by the department's project managers	33,3%	29,6%	14,8%	11,1%	11,1%
5. Regarding the acceptance of the subject "Project Management" by clients of sector projects (i.e., sectors internal or external to the organization that receive the product or service created by the project)	37,0%	37,0%	0,0%	11,1%	14,8%
6. Regarding the level of technical knowledge (or business area) of the management team of each project	25,9%	22,2%	40,7%	11,1%	0,0%
7. Regarding training processes (carried out within the organization), relating to project management	7,4%	14,8%	7,4%	44,4%	25,9%
8. Regarding training processes carried out outside the organization (such as training courses, master's degrees, MBA, certification, etc.) for department professionals involved with project management in the last twelve months	0,0%	18,5%	37,0%	29,6%	14,8%
9. Regarding the type and scope of training processes provided to project managers	0,0%	11,1%	22,2%	33,3%	33,3%
10. Regarding the type and scope of the training process provided to the department's senior management (i.e., senior managers who have some influence on the projects)	11,1%	7,4%	18,5%	29,6%	33,3%
11. Regarding understanding the importance of organizational aspects (Project Management Office, Committee, Matrix Structure, Sponsor, etc.) for the good development of projects	22,2%	22,2%	29,6%	22,2%	3,7%
12. Regarding the process of improving time management software (sequence of tasks, schedules, etc.)	7,4%	7,4%	18,5%	11,1%	55,6%
LEVEL 3 - STANDARDIZATION					
14. Regarding the use of project management methodology by people involved with projects, in the sector	3,7%	44,4%	22,2%	11,1%	18,5%
15. Regarding the computerization of the methodology	3,7%	37,0%	22,2%	14,8%	22,2%
16. Regarding the registration and standardization of the processes that involve the steps for creating the product/service, covering the emergence of the idea, the feasibility study and its approvals (Strategic Planning) and the project cycle	0,0%	37,0%	29,6%	14,8%	18,5%

17. Regarding the planning of each new project and consequent production of the Project Plan	14,8%	33,3%	29,6%	3,7%	18,5%
18. Regarding the sector's Project Management Office (PMO)	14,8%	11,1%	25,9%	7,4%	40,7%
19. Regarding the use of Committees to monitor projects	22,2%	25,9%	22,2%	7,4%	22,2%
20. Regarding the meetings to evaluate the development of each project carried out by the project manager with his team	25,9%	29,6%	25,9%	3,7%	14,8%
21. Regarding monitoring the execution of each project	14,8%	37,0%	22,2%	11,1%	14,8%
22. This s a red herring question, choose Option d	0,0%	0,0%	0,0%	100,0%	0,0%
23. Regarding the technical planning of the product or service that is being developed (i.e., the technical documentation) and that is used by the Technical Leader, the project manager and others who need it	18,5%	37,0%	25,9%	3,7%	14,8%
LEVEL 4 – MANAGEMENT					
24. Regarding the history of projects already closed, regarding the aspects (if applicable): return on investment; quality of the product/service that was created; quality of management storage of Lessons Learned	7,4%	22,2%	29,6%	7,4%	33,3%
25. Regarding portfolio and program management identified in the Strategic Planning for the sector	11,1%	25,9%	18,5%	7,4%	37,0%
26. Regarding continuous improvement in the existing project management model in the sector, practiced through control and measurement of the methodology and computerized systems	3,7%	22,2%	25,9%	29,6%	18,5%
27. Regarding anomalies in tasks that are under development or that have just been carried out (start very late, duration much longer than expected, insufficient budget, etc.)	7,4%	18,5%	25,9%	25,9%	22,2%
28. Regarding the causes of failure of already completed projects (delays, insufficient budget, non-compliance with the planned scope, non-compliance with quality requirements) originating from the sector itself or from external sectors	11,1%	33,3%	22,2%	7,4%	25,9%
29. Regarding monitoring the work carried out by project managers and the encouragement given to them to achieve the goals of their projects	3,7%	11,1%	25,9%	7,4%	51,9%
30. Regarding improving the capacity of project managers in the sector, with an emphasis on human relationships (leadership, negotiation, conflicts motivation, etc.)	0,0%	11,1%	18,5%	14,8%	55,6%
31. Regarding the incentive for project managers in the sector to obtain certification	3,7%	0,0%	11,1%	7,4%	77,8%
32. Regarding the alignment of projects carried out in the sector with the organization's business (or with strategic planning)	11,1%	18,5%	25,9%	18,5%	25,9%
LEVEL 5 – OPTIMIZATION					
33. Regarding the history of projects already closed, regarding the following aspects (if applicable): return on investment; quality of management; technical quality and performance of the product/service obtained	7,4%	N/A	N/A	N/A	92,6%
34. Regarding the history of projects that have already been completed, regarding Lessons Learned	7,4%	N/A	N/A	N/A	92,6%
35. Regarding the assessment of the organizational structure implemented in the sector (Committees, Project Management Office, Project Managers, Sponsors, Project Structure, Matrix Structure, etc.)	11,1%	N/A	N/A	N/A	88,9%
36. Regarding the visibility of our organization in the business community	7,4%	N/A	N/A	N/A	92,6%
37. Regarding the capacity of project managers in the sector in human relations (negotiation, leadership, conflicts, motivation, etc.)	14,8%	N/A	N/A	N/A	85,2%
38. Regarding the existing atmosphere in the sector, regarding project management	25,9%	N/A	N/A	N/A	74,1%
39. Regarding the PMP, IPMA or equivalent certification program for project managers, in the sector	0,0%	N/A	N/A	N/A	100,0%
40. Regarding the causes of project failure (delays, insufficient budget, failure to comply with the expected scope, failure to meet quality requirements) both internal and external to the sector	7,4%	N/A	N/A	N/A	92,6%
41. Regarding the computerization implemented in the sector	11,1%	N/A	N/A	N/A	88,9%
42. Regarding the alignment of projects carried out in the sector with the organization's business (or with strategic planning)	22,2%	N/A	N/A	N/A	77,8%

Table 3: Descriptive analysis. Source: Own Elaboration on SPSS

Question 13

On a scale of 1 to 10, where 1 represents the lowest importance and 10 represents the highest importance, how important are information systems in the healthcare sector and its success?

	Minimum	Maximum	Mean	Std. Deviation
Imp. Information Systems	8	10	9,59	,636

Table 4: Descriptive analysys question 13. Source: Own Elaboration on SPSS

Question 43

If you have selected option "e" in the previous question, indicate your perceived percentage:

	N	Minimum	Maximum	Mean	Std. Deviation
Q_43	13	30	80	58,46	15,053

Table 5: Descriptive analysis question 43. Source: Own Elaboration on SPSS

3. There has been a solid acceptance of the "Project Management" subject by the senior management of the department for at least a year, as approximately 56% selected "option a". Additionally, the senior leadership has been actively promoting the correct application of this knowledge. The remaining options indicating lower levels of maturity in this subject show a lesser representation.

4. The "Project Management" subject is accepted as a management good practice for, at least, a year, by the project managers and these ones feel that the right application of this knowledge is actively promoted in 33% of the institutions. The remaining options indicating lower levels of maturity in this subject show a lesser representation.

5. The "Project Management" subject is accepted by the customers, for at least a year, and in 37% of the institutions, a majority of customers actively promote its usage, and in an equally proportion, in 37% of the institutions, a minority of customers promote its usage.

6. Regarding the technical knowledge of the project management team, the analysis reveals distinct proficiency levels across institutions. Approximately 40.7% exhibit a medium level of knowledge, with existing tools available for enhancement. In approximately 26%, teams demonstrate a high level of expertise. Furthermore, in roughly 22%, the knowledge within

project management teams is nearly sufficient, yet there are accessible tools aimed at further improvement.

7. We have noted a decline in maturity concerning this matter, with 44,4% opting for "option d" and approximately 26% opting for "option e." These findings indicate that within 44.4% of the institutions, initial steps are being taken toward internal training in the field of project management. Conversely, in 26% of the institutions, neither efforts nor courses have been implemented for team members in this regard.

8. Within 37% of the institutions, there's an acceptance of external training, and ongoing analysis is underway to assess the viability of providing master's degrees, MBAs, and other certifications to enhance the career prospects of project management team members in the last year. Meanwhile, in around 30% of the institutions, the examination of external training opportunities is still in its preliminary stages.

9. In none of the institutions has a training process aligned with PMBOK been implemented. Within 33,3%, the initiation of the training process is underway, while an equal 33,3% have yet to start any training process, with no apparent initiative in that regard.

10. We can observe that even though the difference is not significative, there is more investment in the training of senior leaderships with approximately 11% of the institutions implementing a training process aligned with PMBOK for senior leadership roles that have influence in the projects. Similarly with the previous question, 33,3% of the institutions have yet to start any training process, with no apparent initiative in that regard.

11. In approximately 30% of institutions, the organizational aspects are known but its importance is not assessed. In only 3,7% the organizational aspects are not known at all among the main leadership roles.

12. In a majority of institutions, approximately 56%, there are no time management software.

13. As the mean assumes a value of 9,59, we can assume that information systems assume a critical role in the healthcare sector and its success.

14. In 44.4% of the institutions, there is a seemingly comprehensive methodology that has been implemented, covering the five process groups and essential knowledge areas outlined

in the PMBOK., however, its routine utilization is restricted to a few individuals who have been involved in projects for at least one year.

15. In 37% of the institutions, there is a computerization of the methodology for most of the existing projects, however, its routine utilization is restricted to a few individuals who have been involved in projects for at least one year.

16. 37% of the 27 institutions, the referred processes are registered, standardized and in utilization for at least, a year, however, its utilization is restricted to a few individuals. In none of these institutions, these processes are registered and available for all of the team members.

17. We can observe that in one third of the institutions, there's a process that implement a stakeholder meeting and that distinct between small, medium, and big projects. However, this process that is implemented for at least, a year, is restricted for a few members. In approximately 30% of the institutions, the scenario is slightly less advanced, involving a smaller number of members.

18. In almost 41% of the institutions, there's not a PMO. In only almost 15% of the institutions, a PMO is implemented and influence every single project for at least, a year.

19. Regarding the existence of committees to aid in project management, in 26% of the institutions, there are frequent meetings, and they have a strong impact on the development of the most important projects of the sector. This process is implemented for at least, a year, but is only in 22% that this process is extended to all the projects within this department portfolio.

20. In approximately 30% on the institutions, there are meetings to evaluate projects' development, but this process is restricted for few project managers. Notably, this process, that is implemented for at least, a year, is extended for all the project managers in 26% of the inquired institutions.

21. Regarding project monitoring, this process is used by a few project managers in 37% of the institutions. This process is only used by all project managers in 15% of the institutions.

22. As 100% of the institutions answered correctly in this red herring question, all the provided answers were considered as valid.

23. In 37% of the institutions, the technical documentation is restricted for a few members. In roughly 18%, this documentation is shared by all the members who may need it.

It can be observed that in level 3 – Standardization, a notable trend emerges to a predominant majority of responses aligned with "option b".

24. In one third of the institutions, there are few data on metrics such as, return on investment, quality of product/service, quality of management storage of Lessons Learned, among other documents. Moreover, this data is not organized or categorized, and there's not a plan in order to improve that system, once that those documents are not usually used.

25. 37% of the surveyed institutions are unaware of the importance of incorporating portfolio and program management in the Strategic Planning for the sector.

26. Nearly 30% of the institutions lacks a system of continuous improvement, despite being in the process of implementation. Only 3,7% have a mature continuous improvement system in which there's an evaluation of the finished projects, the weaknesses are analyzed and an improvement plan is discussed and implemented.

27. In nearly 26% of the institutions, does not exist a system to analyze project anomalies related to time and cost, despite being in the process of implementation. In an equally 26%, this system exists, but it is in early and immature stages.

28. In 33,3% of the institutions, there is a process of analysis of the projects' failures and its causes, but this process is in early stages.

29. In the majority of institutions, nearly 52%, there's an inexistence of an evaluation system applied to project managers. Only 3,7% of the institutions have an evaluation and rewards system that is implemented for at least, two years.

30. In the majority of institutions, nearly 56%, there's an inexistence of a skills improvement system applied to project managers. None of the institution currently has a structured plan in place to encourage project managers to enhance their knowledge in the human resources field.

31. In the majority of institutions, nearly 79%, there's an inexistence of a structured plan in place to motivate project managers to pursue certifications such as PMP, IPMA, or their equivalents.

Only 3,7% have a structured plan implemented for at least, two years and most project managers have already obtained certifications.

32. Regarding the alignment of projects with the strategic planning, nearly 26% lacks initiatives of this nature and equally almost 26% have a plan, however in early mature stages.

It can be observed that in level 5 – Optimization, a notable trend emerges to "option e". This option gathered the majority of responses in every single question at this level.

33. There's not an excellent and wide data base on metrics such as, return on investment, quality of product/service, among other documents at nearly 93% of the institutions.

34. There's not an excellent and wide data base Lessons Learned at nearly 93% of the institutions.

35. In nearly 89% of the institutions, there's not a mature and adequate organizational structure implemented for at least, two years.

36. Nearly 93% of the institutions acknowledge not being considered as benchmarks.

37. Only in nearly 15% of the institutions, the project managers possess skills and knowledge regarding human relations, for at least, two years.

38. In just about 26%, the project management subject is seen as inherent, leading to efficient planning, smooth execution, and a high success rate.

39. 100% of the institutions acknowledged not reaching an adequate certification rate for their project managers.

40. In terms of documenting the reasons for project failures, only 7,4% register all pertinent information, and corrective actions are consistently implemented for a minimum of two years.

41. Nearly 89% of institutions lack comprehensive computerization, encompassing all essential management aspects and that it's prepared for any project size.

42. Among the 27 institutions, 21 (22,2%) don't think that there's an alignment between projects and strategic planning.

43. Of the 21 who chose "option e," 13 (61,9%) specified the percentage, while 8 (38,1%) did not provide an indication. The mean of the responses to this question was 58,46 suggesting an opportunity for enhancement.

4. Proposal of Good Practices

Based in this analysis of the importance of Information Systems for Healthcare institutions and of the Project Management to standardize practices and to potentialize performance success and based on the results of the actual maturity level of Information Systems Project Management, a few good practices will be proposed.

The application of the Prado Project Management Maturity Model in this dissertation reveals that project management within Portuguese public healthcare institutions currently operates at maturity level 2. At this stage, there is an initial adoption of project management tools, initiatives, and practices. However, it's noteworthy that these practices and knowledge lack standardization, leading to a situation where each professional follows their own approach. Additionally, communication is hindered by the lack of a well-structured IT department and inadequately organized project management activities.

At maturity level 2, the goal is established to reach maturity level 3. Maturity level 3 represents the presence of a project management tool that is validated by the market, the standardization of the workflow, and the adoption of practices such as baseline utilization and key performance indicators (KPIs). These tools facilitate the meticulous tracking of project progress, time, and costs, enabling a comprehensive understanding of gaps and their origins. This, in turn, paves the way for learning from mistakes and enhancing skills. The effective implementation of these practices and the attainment of level 3 should result in an observable increase in the project's success rate.

With that being said, good practices will be proposed for each of the dimensions, according to the maturity level established as a goal and according to PMI (2021) as is one of the organizations that presents the best guidelines for Project Management as Prado (2010) referred:

Project and Program Management Competence; Technical and Contextual Competence; and Behavioral Competence

As it could be observed by the results for the questions, 6, 7, 8, 9, 30, 31, 37, and 39, there's not a great investment in the training of project managers competences and none of the institutions have reached an adequate project management certification rate.

It's proposed to invest in employee training in the subject of project management, that covers the subjects of technical project management, leadership, and strategic and business management.

According to PMI (2021), a competent project manager must have knowledge in three key skills (Figure 7):

- Technical project management.
- Leadership.
- Strategic and business management.

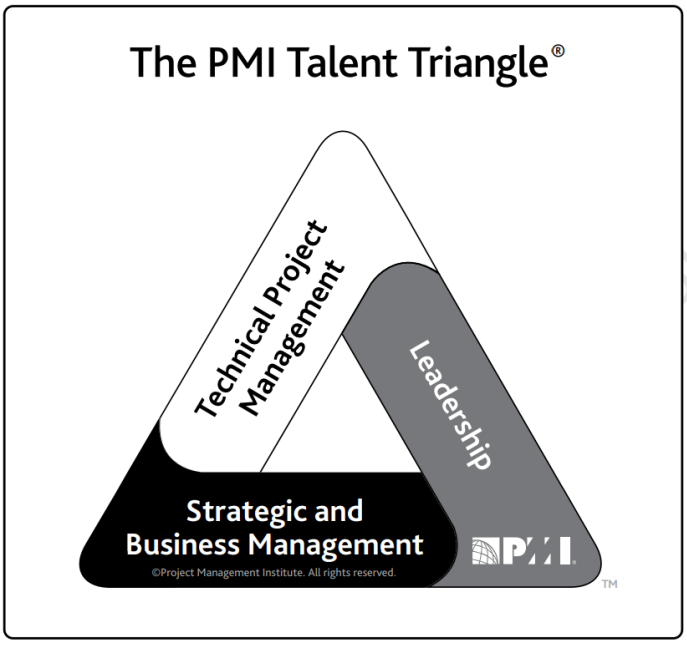

Figure 7: The PMI Talent Triangle

Methodology Usage

By the questions 14, 15, and 26, it's notable that this particular aspect is not the weakest. Nevertheless, it is apparent that some institutions could benefit from enhancements to standardize the maturity level regarding methodology.

It's proposed that SNS should establish a comprehensive document containing guidelines tailored to the specific needs of the IT department in public healthcare institutions. This meticulous standardization ensures consistent implementation of the chosen methodology across the entire project life cycle.

According to PMI (2021), a methodology is a system of practices, techniques, and guidelines used by those who work in a discipline. PMI (2021) defend that a standardized methodology impacts positively on the project's effectiveness and efficiency.

Computerization

According to the results of questions 15 and 41, there's a computerized system, but it's not adequate and, in some institutions, this system is not standardized, and in use by the entire team.

It's proposed the adoption of a standard computerized system for all the necessities throughout the project life cycle, that integrates with the software of all other departments. A crucial aspect of this proposal is the establishment of explicit criteria for the categorization, identification, and nomenclature of documents. Additionally, all team members should have training to familiarize themselves with the organized system, promoting efficient document management and retrieval.

Management systems and organization of documents have a critical role as PMI (2021) notes it. It is imperative that relevant elements of the methodology be computerized and organized, and the system should be intuitive and user-friendly, enabling the correct decisions to be made at the appropriate times PMI (2021).

Strategic Alignment

The descriptive statistics of questions 32, 42, and 43, demonstrates a need to align projects with the strategic planning.

It's proposed the implementation of a structured process during board meetings where in the discussion of objectives and strategies, it's included the agenda for discussion and alignment on the projects aimed at achieving them.

The projects executed within the department should align seamlessly with the organization's strategies. Within portfolios and programs, projects are a way of achieving organization goals (PMI, 2021).

Organizational Structure

With the results of question 35, it can be noted that in most institutions, this structure is not well defined and is not adequate for the sector. From question 18, it is clear that, Portuguese public healthcare institutions lack a structure PMO.

Firstly, it's proposed the creation of a PMO because, as PMI (2021) inform, a PMO is responsible for the establishment of processes, policies, and procedures. Secondly, it is proposed that, during the kick-off meeting of the project, the matrix of responsibilities is discussed using the RACI chart (Figure 8) to ensure clarity and alignment on roles and accountabilities among teams and team members.

RACI Chart	**Person**				
Activity	Ann	Ben	Carlos	Dina	Ed
Create charter	A	R	I	I	I
Collect requirements	I	A	R	C	C
Submit change request	I	A	R	R	C
Develop test plan	A	C	I	I	R
	R = Responsible A = Accountable C = Consult I = Inform				

Figure 8: Example of a RACI chart. Source: PMI (2021)

PMI (2021) suggest the utilization of RACI chart as a tool to communicate team members roles and responsibilities.

According to Archibald and Prado (2014b), once the goal is to upgrade from project management maturity level 2 to maturity level 3, the implementation of the proposed good practices should be in routine by all the institutions for at least 12 months (Figure 9).

Level	Time Span
2	Duration 12 months
3	Duration 12 months
4	Duration 24 months
5	Duration 24 months

Figure 9: Time spans for methodology implementation

5. Conclusions, limitations, and future research

5.1. Conclusions

It can be concluded that within one of the most crucial segments of the healthcare sector, Information Systems, project management lacks maturity. With a current level of 2,3, there is a need to elevate project management maturity to enhance the success rate and improve the quality of the services rendered.

Regarding the impact of region on the maturity level of institutions, it could be observed that this factor has not a significant impact. This is a positive aspect, as it indicates a decentralization in both investment and the implementation of quality processes.

Analysing other articles among science, no conclusion could be achieved as none of the research scopes align with the focus of this dissertation.

Therefore, with insights from the literature, a comprehensive methodology for restructuring this institutions department was developed, incorporating a set of recommended best practices to enhance the maturity level of information systems project management within public healthcare institutions in Portugal. This methodology implementation should be through 1 year as reported by Archibald and Prado (2014b).

It can also be concluded that there is still a long way to go in enhancing project management practices in Public Administration in Portugal, especially regarding the management of information systems projects the healthcare sector. Faced with determining factors such as globalization, decentralization, digital transformation, and the complexity of dealing with current uncertainties, it is suggested that public healthcare institutions, begin as

soon as possible to adopt the practices advocated by project management in the IT/IS departments.

5.2. Limitations

Across 48 public healthcare institutions, we managed to obtain responses from only 27. While this constitutes more than 50%, the limited number of responses may not accurately reflect the true maturity level with precision. The observed disparity among the answers suggests that an additional 21 responses could significantly impact and enhance the reliability of the results. Therefore, it is imperative to seek a more comprehensive and representative dataset to draw more conclusive insights into the overall maturity level.

While evaluating project management maturity, it's important to note that we exclusively utilized Prado's Maturity Model, among the extension models that exist. The application of alternative maturity models may lead to different results, potentially suggesting distinct approaches for restructuring project management practices. Consequently, it becomes evident that our findings represent a singular perspective on project management maturity, derived solely from the view of Prado's Maturity Model.

This evaluation was confined to a theoretical perspective, as practical implementation in a real-life scenario was not possible. Furthermore, the recommendations for good practices were derived from the theoretical outcomes but could not be substantiated through practical validation. Consequently, the effectiveness and efficiency of these proposed practices remain unverified and unproven.

It was intended to conduct a factor analysis, attempting to understand the factors that had the greatest influence on the maturity level. However, the recommended ratio between responses and variables is 10:1 in order to decrease the error in the data (Yong & Pearce, 2013). Once there were 27 answers and 40 questions regarding project management maturity, a 0.7:1 ratio approximately, it can be concluded that this ratio was not met, and for that reason it was not possible to proceed with this analysis.

5.3. Future Research

For future research, it is crucial to employ diverse maturity models to determine the consistency of the project management maturity level across various analyses. This approach serves as a foundational step, providing greater precision and insight for potential reforms within the Project Management Office of healthcare institutions.

Practical application of the proposed best practices within a healthcare institution would also be advantageous for evaluating their benefits. Through the obtained results, the effectiveness of these practices could be assessed, allowing for potential replication in other institutions, if positive outcomes are observed. Conversely, if any negative impacts are identified, a reanalysis can be conducted to refine and improve the practices.

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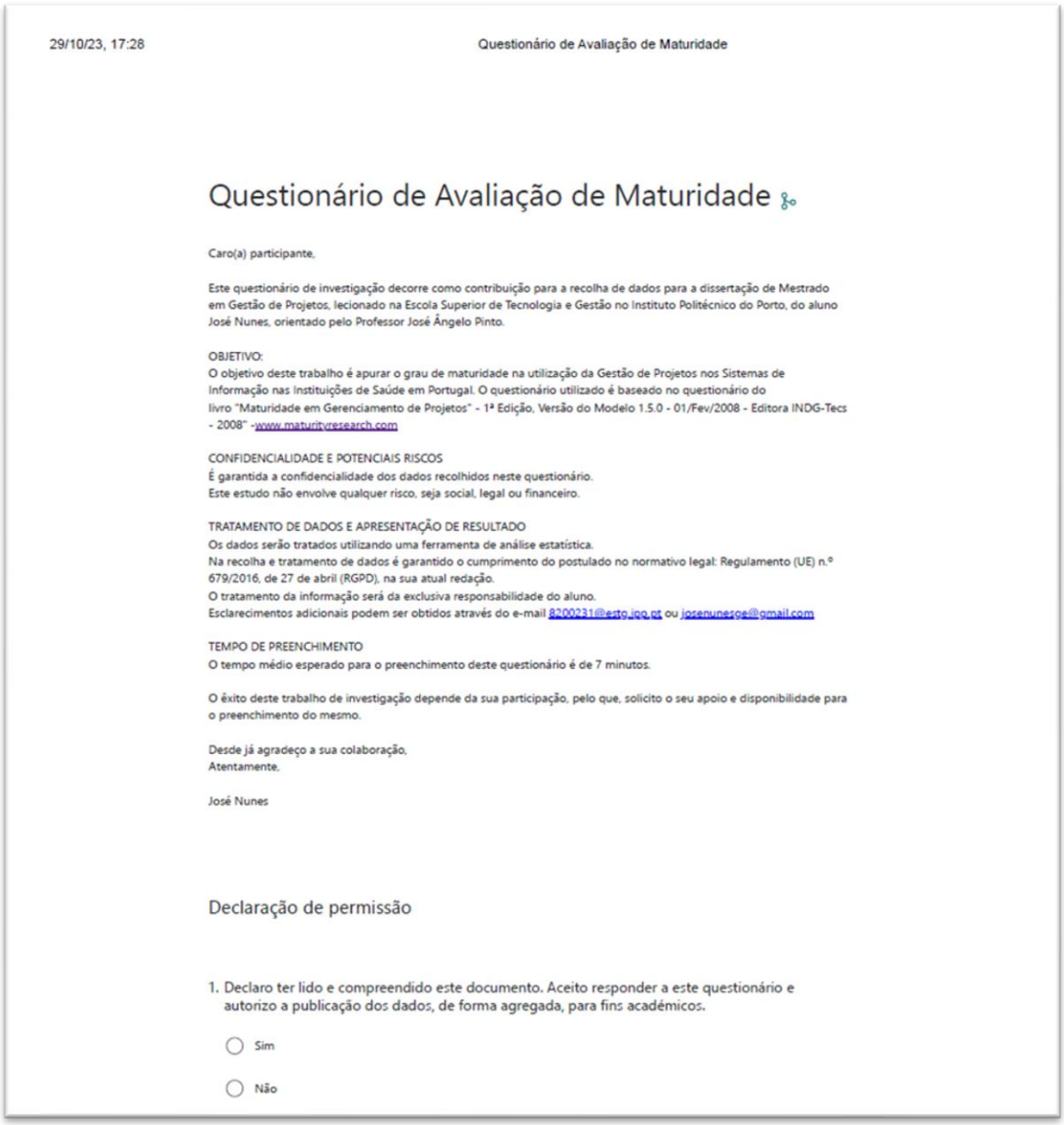
Attachments

A. Survey – Portuguese (PT/PT)



29/10/23, 17:28 Questionário de Avaliação de Maturidade

Questionário de Avaliação de Maturidade

Caro(a) participante,

Este questionário de investigação decorre como contribuição para a recolha de dados para a dissertação de Mestrado em Gestão de Projetos, lecionado na Escola Superior de Tecnologia e Gestão no Instituto Politécnico do Porto, do aluno José Nunes, orientado pelo Professor José Ângelo Pinto.

OBJETIVO:
O objetivo deste trabalho é apurar o grau de maturidade na utilização da Gestão de Projetos nos Sistemas de Informação nas Instituições de Saúde em Portugal. O questionário utilizado é baseado no questionário do livro "Maturidade em Gerenciamento de Projetos" - 1ª Edição, Versão do Modelo 1.5.0 - 01/Fev/2008 - Editora INDG-Tecs - 2008" -www.maturityresearch.com

CONFIDENCIALIDADE E POTENCIAIS RISCOS
É garantida a confidencialidade dos dados recolhidos neste questionário.
Este estudo não envolve qualquer risco, seja social, legal ou financeiro.

TRATAMENTO DE DADOS E APRESENTAÇÃO DE RESULTADO
Os dados serão tratados utilizando uma ferramenta de análise estatística.
Na recolha e tratamento de dados é garantido o cumprimento do postulado no normativo legal: Regulamento (UE) n.º 679/2016, de 27 de abril (RGPD), na sua atual redação.
O tratamento da informação será da exclusiva responsabilidade do aluno.
Esclarecimentos adicionais podem ser obtidos através do e-mail 8200231@estg.ipp.pt ou josenunesge@gmail.com

TEMPO DE PREENCHIMENTO
O tempo médio esperado para o preenchimento deste questionário é de 7 minutos.

O êxito deste trabalho de investigação depende da sua participação, pelo que, solicito o seu apoio e disponibilidade para o preenchimento do mesmo.

Desde já agradeço a sua colaboração,
Atentamente,

José Nunes

Declaração de permissão

1. Declaro ter lido e compreendido este documento. Aceito responder a este questionário e autorizo a publicação dos dados, de forma agregada, para fins académicos.

- ◯ Sim
- ◯ Não

Instituição de Saúde

2. Para que instituição de Saúde trabalha?

NÍVEL 2 - CONHECIMENTO (Linguagem Comum) – Iniciativas Isoladas

3. Em relação à aceitação do assunto "Gestão de Projetos" por parte da alta administração do departamento (ou seja, as chefias superiores que têm alguma influência nos projetos), assinale a opção mais adequada:

- a. O assunto é aceite como uma boa prática de gestão há, pelo menos, um ano. A alta administração estimula fortemente o uso correto desses conhecimentos.
- b. O assunto tal como acima é aceite há mais de 6 meses OU o assunto é praticado há pelo menos um ano, porém, atinge poucos membros da alta administração.
- c. O assunto tal como acima é aceite há menos de 6 meses OU o assunto é pouco aceite como uma boa prática de gestão pela alta administração ou não existe estímulo para o uso correto desses conhecimentos.
- d. Está a ser iniciado um trabalho de conhecimento junto à alta administração.
- e. O assunto parece ser ignorado pela alta administração.

4. Em relação à aceitação do assunto "Gestão de Projetos" por parte dos gestores de projetos do departamento, assinale a opção mais adequada:

- a. O assunto é bastante aceite como uma boa prática de gestão há, pelo menos, um ano. Os gestores de projetos sentem-se fortemente estimulados a utilizar esses conhecimentos.
- b. O assunto é bastante aceite como uma boa prática de gestão há, pelo menos, um ano por um grupo restrito de gestores de projetos.
- c. O assunto é bastante aceite como uma boa prática de gestão há, pelo menos, um ano, mas os gestores de projetos são fracamente estimulados quanto ao uso desses assuntos.
- d. Está se a iniciar um trabalho de cohecimento junto dos gestores de projetos.
- e. Os gestores desconhecem o assunto ou existe algum receio, por parte dos mesmos quanto ao uso desses assuntos.

5. Em relação à aceitação do assunto "Gestão de Projetos" por parte dos clientes dos projetos do setor (ou seja, dos setores internos ou externos à organização que recebem o produto ou serviço criado pelo projeto), assinale a opção mais adequada:

- a. O assunto é bastante aceite como uma boa prática de gestão há, pelo menos, um ano. Os clientes gostam do tema e estimulam seu uso.
- b. O assunto é bastante aceite como uma boa prática de gestão há, pelo menos, um ano, mas por um grupo reduzido de clientes.
- b. O assunto é bastante aceite como uma boa prática de gestão há, pelo menos, um ano, mas os clientes não sabem avaliar exatamente se as práticas de gestão de projetos estão a ser convenientemente utilizadas.
- d. Está a iniciar-se um trabalho de conhecimento junto dos clientes.
- e. Os clientes desconhecem o assunto ou existe algum receio por parte dos gestores quanto ao uso desses assuntos.

6. Em relação ao nível de conhecimento técnico (ou da área do negócio) pela equipa de gestão de cada projeto, assinale a opção mais adequada:

- ◯ a. A equipa conhece suficientemente bem os assuntos técnicos (ou da área de negócio).
- ◯ b. O nível de conhecimento é quase adequado, mas o desenvolvimento e práticas em sala de aula/escritório estão disponibilizados e são utilizados para atingir o nível desejado.
- ◯ c. O nível de conhecimento é médio, mas o desenvolvimento e práticas em sala de aula/escritório estão disponibilizados e são utilizados para se atingir o nível desejado.
- ◯ d. O nível de conhecimento é fraco, e estão a ser feito esforços para disponibilizar processos de melhoria.
- ◯ e. O nível de conhecimento é inexistente e não há nenhuma perspectiva de melhoria.

7. Em relação aos processos de formação (efetuados dentro da organização), relativos a gestão de projetos, assinale a opção mais adequada:

- ◯ a. São realizados cursos internos há algum tempo, abordando assuntos metodológicos e softwares,com frequência e regularidade.
- ◯ b. São realizados cursos internos há algum tempo, abordando assuntos metodológicos e softwares, mas a oferta é muito irregular e insuficiente.
- ◯ c. Os primeiros processos de melhoria internos acabam de ser efetuados e espera-se que se repitam com frequência e regularidade.
- ◯ d. Estão-se a iniciar esforços internos para se ter um programa de melhoria.
- ◯ e. A organização não dá importância a este aspecto e não realizou nenhum curso interno no último ano.

8. Em relação aos processos de formação efetuados fora da organização (tais como cursos de formação, mestrado, MBA, certificação, etc.) para profissionais do departamento envolvidos com gestão de projetos nos últimos doze meses, assinale a opção mais adequada:

- ◯ a. A organização estimula tais iniciativas por meio de vantagens de carreira para os participantes, desde que adequadamente justificadas.
- ◯ b. A organização estimula tais iniciativas, desde que adequadamente justificadas e, eventualmente, pode oferecer vantagens de carreira para os participantes.
- ◯ c. A organização aceita tais iniciativas e está a analisar a viabilidade de oferecer vantagens de carreira aos participantes.
- ◯ d. A organização está a analisar o assunto e pretende divulgar normas para este assunto.
- ◯ e. A organização desconhece ou desestimula tais iniciativas.

9. Em relação ao tipo e abrangência dos processos de formação fornecido aos gestores de projetos, assinale a opção mais adequada:

- a. O processo de formação abordou todos os grupos de processos e áreas de conhecimento, conforme o PMBOK em nível adequado aos gestores de projetos. Praticamente todos os gestores de projetos foram treinados.
- b. O processo de formação abordou todos os grupos de processos e áreas de conhecimento conforme o PMBOK, em nível adequado aos gestores de projetos, mas atingiu uma quantidade restrita de gestores de projetos.
- c. O processo de formação não abordou as áreas identificadas como necessárias ao setor.
- d. Está-se a iniciar um programa de processo de formação.
- e. Não foi realizado nenhum processo de formação para os gestores de projetos e não existe nenhuma iniciativa neste sentido.

10. Em relação ao tipo e abrangência do processo de formação fornecido à alta administração do departamento (ou seja, as chefias superiores que têm alguma influência nos projetos), assinale a opção mais adequada:

- a. O processo de formação abordou as áreas relevantes do PMBOK (adequadas ao departamento), em nível adequado à alta administração. Praticamente toda a alta administração do setor que necessita de formação foi treinada.
- b. O processo de formação abordou as áreas relevantes do PMBOK (adequadas ao setor), em nível adequado à alta administração, mas atingiu uma quantidade insuficiente de profissionais da alta administração do departamento.
- c. O processo de formação fornecido foi considerado insuficiente ou pouco adequado relativamente às necessidades da alta administração do departamento.
- d. Está a ser elaborado um programa de processo de formação para a alta administração.
- e. Não foi fornecido nenhum processo de formação à alta administração do departamento e não existe nenhuma iniciativa neste sentido.

11. Em relação ao entendimento da importância de aspectos organizacionais (Escritório de Gestão de Projetos, Comité, Estrutura Matricial, Sponsor, etc.) para o bom desenvolvimento dos projetos, podemos afirmar que:

- a. As principais lideranças do setor e da alta administração da organização conhecem o assunto, sabem da sua importância para o sucesso de projetos e dão força para sua implementação e aperfeiçoamento.
- b. As principais lideranças do setor e da alta administração da organização conhecem o assunto, sabem da sua importância para o sucesso de projetos, mas não têm tomado nenhuma iniciativa para estimular a implementação e aperfeiçoamento do assunto.
- c. As principais lideranças citadas conhecem o assunto, mas não estão inteiramente confiantes quanto à sua importância para o sucesso de projetos.
- d. Foi iniciado um esforço no sentido de divulgação do assunto junto às lideranças.
- e. As principais lideranças de gestão de projetos do setor e da alta administração da organização desconhecem o assunto.

12. Em relação ao processo de melhoria em softwares para gestão de tempo (sequência de tarefas, cronogramas, etc.), assinale a opção mais adequada:

- ◯ a. Foi fornecida formação a todos profissionais que necessitam deste recurso. Eles utilizam os softwares adequadamente há mais de um ano.
- ◯ b. Foi fornecida formação a todos profissionais que necessitam deste recurso mas apenas um grupo restrito de profissionais usa o software adequadamente de forma rotineira.
- ◯ c. Foi fornecida formação aos profissionais que necessitam deste recurso. Está a iniciar-se a utilização dos softwares.
- ◯ d. Foi feito um plano de formação para software de gestão de tempo.
- ◯ e. Não existem softwares para gestão de tempo no setor da organização.

13. Numa escala de 0 a 10, em que 0 representa a importância mais baixa e 10 representa a importância mais alta, qual é a importância dos sistemas de informação no setor da saúde e no seu sucesso?

1	2	3	4	5	6	7	8	9	10

NIVEL 3 - PADRONIZAÇÃO

14. Em relação ao uso de metodologia de gestão de projetos por pessoas envolvidas com projetos, no setor, assinale a opção mais adequada:

- ◯ a. Existe uma metodologia aparentemente completa, implementada e que aborda os cinco grupos de processos e as áreas de conhecimento, tidas como necessárias, do PMBOK. A sua utilização é rotineira por todos os principais envolvidos com projetos há, pelo menos, um ano.
- ◯ b. Tal como acima, exceto que o uso é restrito a poucos envolvidos.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para se implementar uma metodologia.
- ◯ e. Não existe metodologia implementada e não se tem plano de implementação.

15. Em relação à informatização da metodologia, assinale a opção mais adequada:

- ◯ a. Existe um sistema informatizado para os diversos tipos de projetos do setor, em uso por todos os principais envolvidos há, pelo menos, um ano.
- ◯ b. Tal como acima, exceto que o uso é restrito a poucos envolvidos.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para implementação.
- ◯ e. Não existe informatização implementada e não existe nenhuma iniciativa neste sentido.

16. Em relação ao registo e padronização dos processos que envolvem as etapas para a criação do produto/serviço, abrangendo o surgimento da ideia, o estudo de viabilidade e suas aprovações (Planeamento Estratégico) e o ciclo do projeto, podemos afirmar que:

- ◯ a. Todos os processos acima foram registados, padronizados e, alguns, informatizados. O material produzido está em uso há mais de um ano.
- ◯ b. Tal como acima, exceto que o uso é restrito a poucos envolvidos.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para se iniciar o trabalho citado.
- ◯ e. Ainda não existe uma previsão de quando as tarefas acima serão iniciadas.

17. Em relação ao planeamento de cada novo projeto e consequente produção do Plano do Projeto, podemos afirmar que:

- ◯ a. Este processo é feito conforme padrões estabelecidos que procuram diversas reuniões entre os principais envolvidos e o modelo possui diferenças entre projetos pequenos, médios e grandes. Ele é bem aceite e está em uso há mais de um ano.
- ◯ b. Tal como acima, exceto que o uso é restrito a poucos envolvidos.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para se planear os novos projetos.
- ◯ e. Não existe nenhum padrão em uso e não existem planos para desenvolver nenhum novo modelo. O atual processo é intuitivo e depende de cada um.

18. Em relação ao Escritório de Gestão de Projetos (EGP) do setor, assinale a opção mais adequada:

- ◯ a. Foi implementada e possui forte envolvimento com o planeamento e acompanhamento dos projetos do setor. Está em operação há mais de um ano e influência todos os projetos importantes do setor.
- ◯ b. Tal como acima, exceto que a atuação do EGP é restrita a poucos projetos importantes do setor.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para implementação de um EGP.
- ◯ e. Não existe EGP e não existem planos para a sua implementação.

19. Em relação ao uso de Comités para acompanhamento de projetos, assinale a opção mais adequada:

- ◯ a. Foram implementados, reúnem-se periodicamente e têm forte influência no desenvolvimento dos projetos importantes do setor que foram escolhidos para serem acompanhados pelo comité. Estão em operação há mais de um ano.
- ◯ b. Tal como acima, exceto que a atuação dos comités é restrita a poucos projetos importantes do setor.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para sua implementação.
- ◯ e. Não existem Comités e não existem estudos para sua implementação.

20. Em relação às reuniões de avaliação do desenvolvimento de cada projeto efetuadas pelo gestor do projeto com a sua equipa, assinale a opção mais adequada:

- ◯ a. São organizadas segundo uma disciplina pré-estabelecida que prevê horário, local, pauta, participantes, relatórios, etc. e permitem que todos os membros da equipa percebam o desenvolvimento do projeto. Está em uso por todos os projetos há mais de um ano.
- ◯ b. Tal como acima, exceto que esta prática está restrita a poucos gestores de projetos.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para implementação de reuniões de avaliação do desenvolvimento.
- ◯ e. Não existem. Ao que parece, os projetos ficam à deriva.

21. Em relação ao acompanhamento da execução de cada projeto, assinale a opção mais adequada:

- ◯ a. Os dados adequados são reunidos periodicamente e comparados com o plano baseline. Em caso de desvio, contramedidas são identificadas e designadas aos responsáveis. O modelo funciona e está em uso por todos os projetos há mais de um ano.
- ◯ b. Tal como acima, exceto que esta prática está restrita a poucos gestores de projetos.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para implementar o acompanhamento dos projetos.
- ◯ e. Nada é feito e não existe nenhuma iniciativa neste assunto. Ao que parece, os projetos ficam à deriva.

22. Esta é uma questão de despiste, escolha a Opção d.

- ◯ a. Opção a
- ◯ b. Opção b
- ◯ c. Opção c
- ◯ d. Opção d
- ◯ e. Opção e

23. Com relação ao planeamento técnico do produto ou serviço que está a ser desenvolvido (ou seja, a documentação técnica) e que é utilizado pelo Líder Técnico, pelo Gestor do Projeto e outros que dele necessitam, podemos afirmar que:

- ◯ a. A documentação técnica produzida em cada projeto é de muito boa qualidade e todos os principais envolvidos no setor conhecem o assunto e o tem praticado com muita propriedade há mais de um ano.
- ◯ b. Tal como acima, exceto que esta prática é restrita a poucos que dela necessitam.
- ◯ c. O cenário existente é inferior ao apresentado nos itens A e B.
- ◯ d. Estão a ser feitos estudos para implementação do assunto.
- ◯ e. Nada existe, assim como não existe nenhuma iniciativa no assunto.

NIVEL 4 – GESTÃO

24. Em relação ao histórico de projetos já encerrados, no que toca aos aspetos (caso sejam aplicáveis): retorno do investimento; qualidade do produto/serviço que foi criado; qualidade da gestão; armazenamento de Lições Aprendidas, podemos afirmar que:

- a. Foi criada uma base de dados para reunir estes dados e existe uma quantidade adequada de dados que são de ótima qualidade. O sistema está em uso há mais de dois anos pelos principais envolvidos, para planear novos projetos e evitar erros do passado.
- b. Tal como acima, exceto que o uso da base de dados é restrito a poucos gestores de projetos.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Estão a ser feitos estudos para se criar uma base de dados tal como acima.
- e. Existem alguns dados, mas estão dispersos e não existe um arquivamento informatizado central. Não existe a prática do uso. Não existe um plano para se atacar o assunto.

25. Em relação à gestão de portfólio e de programas identificados no Planeamento Estratégico para o setor, assinale a opção mais adequada:

- a. Todos os porftólios e programas recebem um atendimento especial, tendo o seu próprio gestor, além dos gestores de cada projeto. Esta gestão é feita em sincronia com o responsável pelas metas estratégicas da organização há mais de 2 anos.
- b. Tal como acima, exceto que restrito a uns poucos portfólios e/ou programas.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Está ser criada uma abordagem para dar prioridade a portfólios e programas identificados pelo Planeamento Estratégico
- e. Desconhece-se a importância deste assunto.

26. Em relação à Melhoria Contínua no modelo de gestão de projetos existente no setor, praticada por meio de controlo e medição da metodologia e do sistema informatizado, assinale a opção mais adequada:

- a. Existe um sistema de melhoria contínua pelo qual os processos são permanentemente avaliados e os aspectos que mostram fragilidade ou inadequabilidade são discutidos e melhorados. É bem aceite e praticado pelos principais envolvidos há mais de 2 anos.
- b. Tal como acima, exceto que esta prática ainda é restrita.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Está a ser implementado um programa de melhoria contínua.
- e. O assunto ainda não foi abordado.

27. Em relação às anomalias em tarefas que estão em desenvolvimento ou que acabaram de ser executadas (início muito fora do previsto, duração muito além da prevista, insuficiência do orçamento, etc.), assinale a opção mais adequada:

- a. Existe um procedimento praticado por todos os gestores de projeto pelo qual se reunem dados de anomalias de tarefas e se efetua uma análise para identificar os principais fatores. Está em uso com sucesso há mais de dois anos.
- b. Tal como acima, exceto que esta prática ainda é restrita a poucos projetos.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Está a ser implementado um sistema com o objetivo citado na primeira opção.
- e. O assunto não foi abordado.

28. Em relação às causas de fracasso de projetos já encerrados (atrasos, insuficiência do orçamento, não obediência ao âmbito previsto, não atendimento às exigências de qualidade) oriundas do próprio setor ou de setores externos, assinale a opção mais adequada:

- a. Todas as principais causas de fracasso foram identificadas. Foram estabelecidas e implementadas contramedidas para evitar que estas causas se repitam. Todos os principais envolvidos utilizam estes conhecimentos há mais de dois anos.
- b. Tal como acima, exceto que as conclusões e uso desta prática ainda são preliminares.
- c. O cenário existente é inferior ao apresentado nos itens A e B
- d. Estão a ser feitos estudos para se implementar um sistema tal como o acima.
- e. Ainda não existe um trabalho nesta direção.

29. Em relação ao acompanhamento do trabalho efetuado pelos gestores de projetos e ao estímulo que lhes é concedido no sentido de atingirem as metas de seus projetos, assinale a opção mais adequada:

- a. Existe um Sistema de Avaliação dos gestores de projetos, pelo qual se estabelecem metas e, no final do período, avalia-se quão bem eles se destacaram, podendo, então, obter bónus pelo desempenho. O sistema funciona com sucesso há pelo menos dois anos.
- b. Tal como acima, exceto que esta prática ainda é aplicada a poucos gestores.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Foram feitos estudos nesta direção e estão a ser implementados.
- e. Não existe nenhuma iniciativa nessa direção.

30. Em relação ao aperfeiçoamento da capacidade dos gestores de projetos do setor, com ênfase em relacionamentos humanos (liderança, negociação, conflitos, motivação, etc.), assinale a opção mais adequada:

- a. Existe um plano estruturado formal de desenvolvimento e praticamente todos os gestores de projeto já passaram por este plano. Os cursos são de ótima qualidade, são bem avaliados e o modelo tem funcionado com sucesso nos últimos dois anos.
- b. Tal como acima, exceto que esta prática ainda é restrita a poucos tipos de formação.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Estão a ser feitos estudos para se fornecer formação avançada de qualidade.
- e. Não existe nenhuma iniciativa nessa direção.

31. Em relação ao estímulo para a obtenção de certificação pelos gestores de projetos do setor, assinale a opção mais adequada:

- a. Existe um plano em execução para estimular os gestores de projetos a obter uma certificação PMP, IPMA ou equivalente. Este plano está em funcionamento há mais de dois anos e uma quantidade significativa de gestores de projetos já obteve certificação.
- b. Tal como acima, exceto que esta prática atingiu uma parcela de gestores de projetos.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. O assunto é visto com seriedade e pretende-se montar um plano neste sentido.
- e. Não existe nenhuma iniciativa neste sentido.

32. Em relação ao alinhamento dos projetos executados no setor com os negócios da organização (ou com o Planejamento Estratégico), assinale a opção mais adequada:

- a. Foram criados critérios enérgicos para que os novos projetos somente sejam aceites se alinhados com os negócios da organização e eles têm sido respeitados. O sistema funciona eficientemente há mais de dois anos.
- b. Tal como acima, exceto que, algumas vezes, os critérios não são respeitados.
- c. O cenário existente é inferior ao apresentado nos itens A e B.
- d. Estão a ser feitos estudos para a criação dos critérios.
- e. Não existem critérios enérgicos de alinhamento com os negócios da organização para os novos projetos.

NÍVEL 5 – OTIMIZAÇÃO

33. Em relação ao histórico de projetos já encerrados, no que toca aos seguintes aspectos (caso aplicáveis): retorno do investimento; qualidade da gestão; qualidade técnica e desempenho do produto/serviço obtido, assinale a opção mais adequada:

- ◯ a. Existe uma ampla e excelente base de dados (ou algo semelhante), que é utilizado rotineiramente pelos gestores de projetos há, pelo menos, 2 anos.
- ◯ e. Existe uma base de dados (ou algo semelhante), que não pode ser classificado como amplo e excelente ou não é utilizado rotineiramente pelos gestoress de projetos.

34. Em relação ao histórico de projetos já encerrados, no que toca a Lições Aprendidas, assinale a opção mais adequada:

- ◯ a. Existe uma ampla e excelente base de dados (ou algo semelhante), que é utilizado rotineiramente pelos gerentes de projetos há, pelo menos, 2 anos.
- ◯ e. Existe uma base de dados (ou algo semelhante), que não pode ser classificado de ampla e excelente ou não é utilizada rotineiramente pelos gestores de projetos.

35. Em relação à avaliação da estrutura organizacional implementada no setor (Comités, Escritório de Gestão de Projetos, Gestores de Projetos, Sponsors, Estrutura Projetada, Estrutura Matricial, etc.), assinale a opção mais adequada:

- ◯ a. A estrutura implementada é perfeitamente adequada ao setor e funciona de forma totalmente convincente há, pelo menos, 2 anos.
- ◯ e. O cenário da opção anterior ainda não foi atingido.

36. Em relação à visibilidade de nossa organização na comunidade empresarial, assinale a opção mais adequada:

- ◯ a. A nossa organização é vista e citada como benchmark em gestão de projetos há, pelos menos, 2 anos. Recebemos frequentes visitas de outras organizações para conhecer o nosso sistema de gestão de projetos.
- ◯ e. Ainda estamos muito longe de ser reconhecidos como benchmark.

37. Em relação à capacidade dos gestores de projetos do setor em relações humanos (negociação, liderança, conflitos, motivação, etc.), assinale a opção mais adequada:

- ◯ a. Quase a totalidade de nossos gestores é altamente avançado nesses aspetos há pelos menos 2 anos.
- ◯ e. Ainda estamos muito longe de atingir o nível acima.

38. Em relação ao clima existente no setor, relativamente a gestão de projetos, assinale a opção mais adequada:

- ◯ a. O assunto gestão de projetos é visto como "algo natural" no setor há, pelo menos, 2 anos. Os projetos são planeados com rapidez e eficiência e a execução ocorre num clima de baixo stress, baixo ruído e alto nível de sucesso.
- ◯ e. Ainda não atingimos o cenário acima.

39. Em relação ao programa de certificação PMP, IPMA ou equivalente para os gestores de projetos do setor, assinale a opção mais adequada:

- ◯ a. A quantidade adequada e necessária de gestores certificados foi atingida.
- ◯ e. Ainda não atingimos a quantidade adequada e necessária.

40. Em relação às causas de fracasso dos projetos (atrasos, insuficiência do orçamento, não obediência do âmbito previsto, não atendimento a exigências de qualidade), tanto internas como externas ao setor, assinale a opção mais adequada:

- ◯ a. Todas as causas foram registadas e as ações de correção já são executadas com sucesso quase total há, pelo menos, 2 anos.
- ◯ e. Ainda existe muito trabalho a ser feito neste sentido.

41. Em relação à informatização implementada no setor, assinale a opção mais adequada:

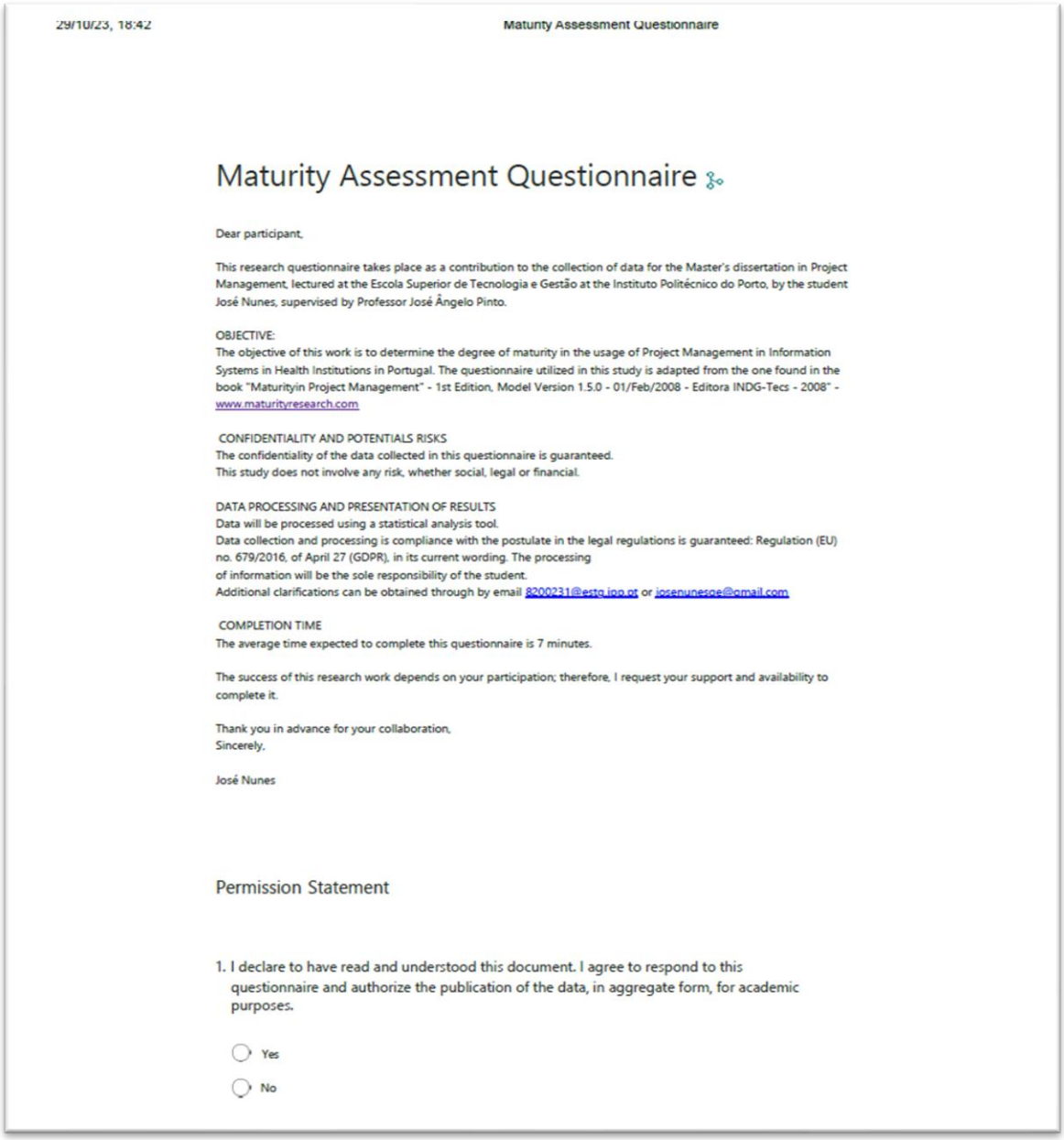
- ◯ a. Ela é totalmente adequada ao setor, aborda todos os aspectos necessários à gestão, pode ser utilizada por diferentes tamanhos de projeto e é utilizada rotineiramente durante todo o ciclo de vida de cada projeto há, pelo menos, 2 anos.
- ◯ e. Ainda não atingimos o cenário acima.

42. Em relação ao alinhamento dos projetos executados no setor com os negócios da organização (ou com o planeamento estratégico), assinale a opção mais adequada:

- ◯ e. O alinhamento não é de 100%
- ◯ a. O alinhamento é de 100%

43. Caso tenha selecionado a opção "e" na questão anterior, indique qual a sua percentagem percecionada:

B. Survey – English (ENG)



29/10/23, 18:42 Maturity Assessment Questionnaire

Maturity Assessment Questionnaire

Dear participant,

This research questionnaire takes place as a contribution to the collection of data for the Master's dissertation in Project Management, lectured at the Escola Superior de Tecnologia e Gestão at the Instituto Politécnico do Porto, by the student José Nunes, supervised by Professor José Ângelo Pinto.

OBJECTIVE:
The objective of this work is to determine the degree of maturity in the usage of Project Management in Information Systems in Health Institutions in Portugal. The questionnaire utilized in this study is adapted from the one found in the book "Maturityin Project Management" - 1st Edition, Model Version 1.5.0 - 01/Feb/2008 - Editora INDG-Tecs - 2008" - www.maturityresearch.com

CONFIDENTIALITY AND POTENTIALS RISKS
The confidentiality of the data collected in this questionnaire is guaranteed.
This study does not involve any risk, whether social, legal or financial.

DATA PROCESSING AND PRESENTATION OF RESULTS
Data will be processed using a statistical analysis tool.
Data collection and processing is compliance with the postulate in the legal regulations is guaranteed: Regulation (EU) no. 679/2016, of April 27 (GDPR), in its current wording. The processing
of information will be the sole responsibility of the student.
Additional clarifications can be obtained through by email 8200231@estg.ipp.pt or josenunesge@gmail.com

COMPLETION TIME
The average time expected to complete this questionnaire is 7 minutes.

The success of this research work depends on your participation; therefore, I request your support and availability to complete it.

Thank you in advance for your collaboration,
Sincerely,

José Nunes

Permission Statement

1. I declare to have read and understood this document. I agree to respond to this questionnaire and authorize the publication of the data, in aggregate form, for academic purposes.

- ◯ Yes
- ◯ No

Healthcare Institution

2. Which healthcare institution do you work for?

LEVEL 2 - KNOWLEDGE (Common Language) – Isolated Initiatives

3. Regarding the acceptance of the subject "Project Management" by the department's senior management (i.e., the senior managers who have some influence on the projects), select the most appropriate option:

- ○ a. The subject has been accepted as good management practice for at least a year. Senior management strongly encourages the correct use of this knowledge.
- ○ b. The subject as above has been accepted for more than 6 months OR the subject has been practiced for at least a year, however, it affects few members of senior management.
- ○ c. The subject as above has been accepted for less than 6 months OR the subject is little accepted as a good management practice by senior management or there is no incentive for the correct use of this knowledge.
- ○ d. Knowledge work is being initiated with senior management.
- ○ e. The matter appears to be ignored by senior management.

4. Regarding the acceptance of the subject "Project Management" by the department's project managers, select the most appropriate option:

- ○ a. The subject has been widely accepted as good management practice for at least a year. Project managers feel strongly encouraged to use this knowledge.
- ○ b. The subject has been widely accepted as a good management practice for at least a year by a restricted group of project managers.
- ○ c. The subject has been widely accepted as good management practice for at least a year, but project managers are poorly encouraged to use these subjects.
- ○ d. Knowledge work is beginning with project managers.
- ○ e. Managers are unaware of the subject or there is some fear on their part regarding the use of these subjects.

5. Regarding the acceptance of the subject "Project Management" by clients of sector projects (i.e., sectors internal or external to the organization that receive the product or service created by the project), select the most appropriate option:

- ○ a. The subject has been widely accepted as good management practice for at least a year. Customers like the theme and encourage its use.
- ○ b. The subject has been widely accepted as a good management practice for at least a year, but by a small group of clients.
- ○ c. The subject has been widely accepted as a good management practice for at least a year, but clients do not know exactly whether project management practices are being used appropriately.
- ○ d. Knowledge work is beginning with customers.
- ○ e. Customers are unaware of the subject or there is some fear on the part of managers regarding the use of these subjects.

6. In relation to the level of technical knowledge (or business area) of the management team of each project, select the most appropriate option:

- a. The team knows technical issues (or the business area) well enough.
- b. The level of knowledge is almost adequate, but classroom/office development and practices are available and used to reach the desired level.
- c. The level of knowledge is medium, but development and practices in the classroom/office are available and used to reach the desired level.
- d. The level of knowledge is low, and efforts are being made to provide improvement processes.
- e. The level of knowledge is non-existent and there is no prospect of improvement.

7. In relation to training processes (carried out within the organization), relating to project management, select the most appropriate option:

- a. Internal courses have been held for some time, covering methodological issues and software, frequently and regularly.
- b. Internal courses have been running for some time, covering methodological issues and software, but the offer is very irregular and insufficient.
- c. The first internal improvement processes have just been carried out and are expected to be repeated frequently and regularly.
- d. Internal efforts are beginning to have an improvement program.
- e. The organization does not attach importance to this aspect and has not held any internal courses in the last year.

8. In relation to training processes carried out outside the organization (such as training courses, master's degrees, MBA, certification, etc.) for department professionals involved with project management in the last twelve months, select the most appropriate option:

- a. The organization encourages such initiatives through career advantages for participants, as long as they are adequately justified.
- b. The organization encourages such initiatives, as long as they are adequately justified, and may eventually offer career advantages to participants.
- c. The organization accepts such initiatives and is analyzing the feasibility of offering career advantages to participants.
- d. The organization is analyzing the matter and intends to publish standards for this matter.
- e. The organization is unaware of or discourages such initiatives.

9. Regarding the type and scope of training processes provided to project managers, select the most appropriate option:

- a. The training process covered all process groups and knowledge areas, according to the PMBOK at a level suitable for project managers. Practically all project managers were trained.
- b. The training process covered all process groups and knowledge areas according to the PMBOK, at a level suitable for project managers, but reached a restricted number of project managers.
- c. The training process did not address the areas identified as necessary for the sector.
- d. A training process program is being initiated.
- e. No training process was carried out for project managers and there is no initiative in this regard.

10. Regarding the type and scope of the training process provided to the department's senior management (i.e., senior managers who have some influence on the projects), select the most appropriate option:

- a. The training process covered the relevant areas of the PMBOK (appropriate to the department), at a level appropriate to senior management. Practically all senior management in the sector that required training were trained.
- b. The training process covered the relevant areas of the PMBOK (appropriate to the sector), at a level suitable for senior management, but reached an insufficient number of senior management professionals in the department.
- c. The training process provided was considered insufficient or inadequate in relation to the needs of the department's senior management.
- d. A training process program for senior management is being developed.
- e. No training process was provided to the department's senior management and there is no initiative in this regard.

11. In relation to understanding the importance of organizational aspects (Project Management Office, Committee, Matrix Structure, Sponsor, etc.) for the good development of projects, we can state that:

- a. The main leaders of the sector and the organization's senior management know the subject, know its importance for the success of projects and give strength to its implementation and improvement.
- b. The main leaders of the sector and the organization's senior management are aware of the subject, aware of its importance for the success of projects, but have not taken any initiative to encourage the implementation and improvement of the subject.
- c. The main leaders mentioned know the subject, but are not entirely confident about its importance for the success of projects.
- d. An effort was initiated to publicize the issue among leaders.
- e. The sector's main project management leaders and the organization's senior management are unaware of the matter.

12. Regarding the process of improving time management software (sequence of tasks, schedules, etc.), select the most appropriate option:

- a. Training was provided to all professionals who need this resource. They have been using the softwareproperly for over a year.
- b. Training was provided to all professionals who need this resource, but only a restricted group of professionals use the software properly on a routine basis.
- c. Training was provided to professionals who need this resource. The use of software is beginning.
- d. A training plan for time management software was created.
- e. There is no software for time management in the organization's sector.

13. On a scale of 0 to 10, where 0 represents the lowest importance and 10 represents the highest importance, how important are information systems in the healthcare sector and its success?

1	2	3	4	5	6	7	8	9	10

LEVEL 3 - STANDARDIZATION

14. Regarding the use of project management methodology by people involved with projects, in the sector, select the most appropriate option:

- a. There is an apparently complete methodology implemented that addresses the five groups of processes and areas of knowledge considered necessary in the PMBOK. It has been routinely used by all key project stakeholders for at least a year.
- b. As above, except that use is restricted to a few stakeholders.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to implement a methodology.
- e. There is no methodology implemented and there is no implementation plan.

15. Regarding the computerization of the methodology, select the most appropriate option:

- a. There is a computerized system for the different types of projects in the sector, in use by all the main parties involved for at least a year.
- b. As above, except that use is restricted to a few stakeholders.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out for implementation.
- e. There is no computerization implemented and there is no initiative in this regard.

16. In relation to the registration and standardization of the processes that involve the steps for creating the product/service, covering the emergence of the idea, the feasibility study and its approvals (Strategic Planning) and the project cycle, we can state that:

- a. All of the above processes were registered, standardized and, some, computerized. The material produced has been in use for more than a year.
- b. As above, except that use is restricted to a few stakeholders.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to begin the aforementioned work.
- e. There is still no estimate of when the above tasks will begin.

17. In relation to the planning of each new project and consequent production of the Project Plan, we can state that:

- a. This process is carried out according to established standards that seek several meetings between the main stakeholders and the model has differences between small, medium and large projects. It is well accepted and has been in use for over a year.
- b. As above, except that use is restricted to a few stakeholders.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to plan new projects.
- d. There is no standard in use and there are no plans to develop any new models. The current process is intuitive and depends on each person.

18. In relation to the sector's Project Management Office (PMO), select the most appropriate option:

- a. It was implemented and has strong involvement in the planning and monitoring of sector projects. It has been in operation for over a year and influences all important projects in the sector.
- b. As above, except that EGP's activities are restricted to a few important projects in the sector.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to implement a PMO.
- e. There is no PMO and there are no plans for its implementation.

19. Regarding the use of Committees to monitor projects, select the most appropriate option:

- a. They were implemented, meet periodically, and have a strong influence on the development of important projects in the sector that were chosen to be monitored by the committee. They have been in operation for over a year.
- b. As above, except that the committees' activities are restricted to a few important projects in the sector.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out for its implementation.
- e. There are no Committees and there are no studies for their implementation.

20. Regarding the meetings to evaluate the development of each project carried out by the project manager with his team, select the most appropriate option:

- a. They are organized according to a pre-established discipline that foresees time, place, agenda, participants, reports, etc. and allow all team members to understand the development of the project. It has been in use by all projects for over a year.
- b. As above, except that this practice is restricted to a few project managers.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to implement development assessment meetings.
- e. Do not exist. It seems that projects are adrift.

21. Regarding monitoring the execution of each project, select the most appropriate option:

- a. Appropriate data is gathered periodically and compared to the baseline plan. In case of deviation, countermeasures are identified and assigned to those responsible. The model works and has been in use by all projects for over a year.
- b. As above, except that this practice is restricted to a few project managers.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to implement project monitoring.
- e. Nothing is done and there is no initiative on this matter. It seems that projects are adrift.

22. This is a red herring question, choose Option d.

- a. Option a
- b. Option b
- c. Option c
- d. Option d
- e. Option e

23. Regarding the technical planning of the product or service that is being developed (i.e., the technical documentation) and that is used by the Technical Leader, the Project Manager and others who need it, we can state that:

- ◯ a. The technical documentation produced in each project is of very good quality and all the main people involved in the sector know the subject and have been practicing it with great expertise for over a year.
- ◯ b. As above, except this practice is restricted to the few who need it.
- ◯ c. The existing scenario is inferior to that presented in items A and B.
- ◯ d. Studies are being carried out to implement the subject.
- ◯ e. Nothing exists, just as there is no initiative on the subject.

LEVEL 4 – MANAGEMENT

24. In relation to the history of projects already closed, regarding the aspects (if applicable): return on investment; quality of the product/service that was created; quality of management; storage of Lessons Learned, we can state that:

- ◯ a. A database was created to gather this data and there is an adequate amount of data that is of excellent quality. The system has been in use for more than two years by the main stakeholders, to plan new projects and avoid past mistakes.
- ◯ b. As above, except that use of the database is restricted to a few project managers.
- ◯ c. The existing scenario is inferior to that presented in items A and B.
- ◯ d. Studies are being carried out to create a database as above.
- ◯ e. There is some data, but it is dispersed and there is no central computerized archiving. There is no practiceof use. There is no plan to attack the issue.

25. In relation to portfolio and program management identified in the Strategic Planning for the sector, select the most appropriate option:

- ◯ a. All portfolios and programs receive special service, having their own manager, in addition to the managers of each project. This management has been carried out in sync with the person responsible for the organization's strategic goals for more than 2 years.
- ◯ b. As above, except restricted to a few portfolios and/or programs.
- ◯ c. The existing scenario is inferior to that presented in items A and B.
- ◯ d. An approach is being created to prioritize portfolios and programs identified by Strategic Planning
- ◯ e The importance of this issue is unknown.

26. In relation to Continuous Improvement in the existing project management model in the sector, practiced through control and measurement of the methodology and computerized system, select the most appropriate option:

- ◯ a. There is a continuous improvement system through which processes are permanently evaluated and aspects that show weakness or inadequacy are discussed and improved. It has been well accepted and practiced by the main stakeholders for more than 2 years.
- ◯ b. As above, except this practice is still restricted.
- ◯ c. The existing scenario is inferior to that presented in items A and B.
- ◯ d. A continuous improvement program is being implemented.
- ◯ e. The matter has not yet been addressed.

27. In relation to anomalies in tasks that are under development or that have just been carried out (start very late, duration much longer than expected, insufficient budget, etc.), select the most appropriate option:

- a. There is a procedure practiced by all project managers by which task anomaly data is gathered and an analysis is carried out to identify the main factors. It has been in use successfully for over two years.
- b. As above, except that this practice is still restricted to a few projects.
- c. The existing scenario is inferior to that presented in items A and B.
- d. A system is being implemented with the objective mentioned in the first option.
- e. The subject was not addressed.

28. In relation to the causes of failure of already completed projects (delays, insufficient budget, non-compliance with the planned scope, non-compliance with quality requirements) originating from the sector itself or from external sectors, select the most appropriate option:

- a. All major causes of failure have been identified. Countermeasures have been established and implemented to prevent these causes from recurring. All key stakeholders have been using this knowledge for more than two years.
- b. As above, except that the conclusions and use of this practice are still preliminary.
- c. The existing scenario is inferior to that presented in items A and B
- d. Studies are being carried out to implement a system such as the one above.
- e. There is still no work in this direction.

29. In relation to monitoring the work carried out by project managers and the encouragement given to them to achieve the goals of their projects, select the most appropriate option:

- a. There is an Evaluation System for project managers, through which goals are established and, at the end of the period, how well they performed is evaluated, and they can then obtain bonuses for their performance. The system has been operating successfully for at least two years.
- b. As above, except that this practice is still applied to few managers.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies have been carried out in this direction and are being implemented.
- e. There is no initiative in this direction.

30. In relation to improving the capacity of project managers in the sector, with an emphasis on human relationships (leadership, negotiation, conflicts, motivation, etc.), select the most appropriate option:

- a. There is a formal structured development plan and practically all project managers have already gone through this plan. The courses are of excellent quality, are well evaluated and the model has been operating successfully over the last two years.
- b. As above, except that this practice is still restricted to a few types of training.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to provide quality advanced training.
- e. There is no initiative in this direction.

31. Regarding the incentive for project managers in the sector to obtain certification, select the most appropriate option:

- a. There is a plan in place to encourage project managers to obtain a PMP, IPMA or equivalent certification. This plan has been in operation for more than two years and a significant number of project managers have already obtained certification.
- b. As above, except that this practice affected a portion of project managers.
- c. The existing scenario is inferior to that presented in items A and B.
- d. The matter is taken seriously and we intend to put together a plan in this regard.
- e. There is no initiative in this regard.

32. Regarding the alignment of projects carried out in the sector with the organization's business (or with Strategic Planning), select the most appropriate option:

- a. Strong criteria were created so that new projects are only accepted if they are aligned with the organization's business and they have been respected. The system has been operating efficiently for more than two years.
- b. As above, except that sometimes the criteria are not met.
- c. The existing scenario is inferior to that presented in items A and B.
- d. Studies are being carried out to create the criteria.
- e. There are no strong alignment criteria with the organization's business for new projects.

LEVEL 5 – OPTIMIZATION

33. In relation to the history of projects already closed, regarding the following aspects (if applicable): return on investment; quality of management; technical quality and performance of the product/service obtained, select the most appropriate option:

- ○ a. There is a large and excellent database (or something similar), which has been routinely used by project managers for at least 2 years.
- ○ e. There is a database (or something similar) that cannot be classified as broad and excellent or is not routinely used by project managers.

34. Regarding the history of projects that have already been completed, regarding Lessons Learned, select the most appropriate option:

- ○ a. There is a large and excellent database (or something similar), which has been routinely used by project managers for at least 2 years.
- ○ e. There is a database (or something similar) that cannot be classified as broad and excellent or is not routinely used by project managers.

35. Regarding the assessment of the organizational structure implemented in the sector (Committees, Project Management Office, Project Managers, Sponsors, Projected Structure, Matrix Structure, etc.), select the most appropriate option:

- ○ a. The implemented structure is perfectly suited to the sector and has worked completely convincingly for at least 2 years.
- ○ e. The scenario of the previous option has not yet been achieved.

36. Regarding the visibility of our organization in the business community, select the most appropriate option:

- ○ a. Our organization has been seen and cited as a benchmark in project management for at least 2 years. We receive frequent visits from other organizations to learn about our project management system.
- ○ e. We are still a long way from being recognized as a benchmark.

37. Regarding the capacity of project managers in the sector in human relations (negotiation, leadership, conflicts, motivation, etc.), select the most appropriate option:

- ○ a. Almost all of our managers have been highly advanced in these aspects for at least 2 years.
- ○ e. We are still a long way from reaching the above level.

38. In relation to the existing climate in the sector, regarding project management, select the most appropriate option:

- ◯ a. The subject of project management has been seen as "something natural" in the sector for at least 2 years. Projects are planned quickly and efficiently, and execution occurs in a climate of low stress, low noise and a highlevel of success.
- ◯ e. We have not yet reached the above scenario.

39. Regarding the PMP, IPMA or equivalent certification program for project managers in the sector, select the most appropriate option:

- ◯ a. The adequate and necessary number of certified managers has been reached.
- ◯ e. We have not yet reached the adequate and necessary quantity.

40. In relation to the causes of project failure (delays, insufficient budget, failure to comply with the expected scope, failure to meet quality requirements), both internal and external to the sector, select the most appropriate option:

- ◯ a. All causes were registered and corrective actions have been carried out with almost complete success for at least 2 years.
- ◯ e. There is still a lot of work to be done in this regard.

41. Regarding the computerization implemented in the sector, select the most appropriate option:

- ◯ a. It is fully suited to the sector, addresses all aspects necessary for management, can be used for different project sizes and is routinely used throughout the entire life cycle of each project for at least 2 years.
- ◯ e. We have not yet reached the above scenario.

42. Regarding the alignment of projects carried out in the sector with the organization's business (or with strategic planning), select the most appropriate option:

- ◯ a. The alignment is 100%
- ◯ e. The alignment is not 100%

43. If you selected option "e" in the previous question, indicate your perceived percentage:

C. Project Management Maturity Level Assessment

According to Prado (2010) the questionnaire shown ahead can be used to evaluate the maturity of an organization's department or sector (such as Engineering, Product Development, I.T., etc.).

How to evaluate the answers:

Use the table below to evaluate the answers:

- Option A: 10 points.
- Option B: 7 points.
- Option C: 4 points.
- Option D: 2 points.
- Option E: 0 points.

It is convenient to give visibility to the adherence profile, filling out the table below:

Level	Total Score	Adherence Profile									
		10	20	30	40	50	60	70	80	90	100
2											
3											
4											
5											

After evaluating the answers, insert the final score in the formula below:

Final Maturity Score = (100 + total_score) / 100