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PROJECT MANAGEMENT METHODOLOGY APPLIED TO THE MILITARY PROGRAMMING LAW – REVIEW OF THE ORGANIZATIONAL MODEL[1]

METODOLOGIA DE GESTÃO DE PROJETOS APLICADA À LEI DE PROGRAMAÇÃO MILITAR – REVISÃO DO MODELO DE ORGANIZAÇÃO

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Abstract

Currently, the Armed Forces procure the weapons and equipment they need to fulfill their missions through projects funded in the Military Programming Law. These projects are a key way of adding value to the military, as it is through them that the Armed Forces build the capabilities they need to fulfill their national and international commitments. Therefore, there is a need to identify aspects that can be improved in the organization's project management model. This study used an inductive reasoning methodology supported by a qualitative research strategy and a comparative research design. The findings revealed that there is no single structure that fits all organizations, and that each organization should choose the organizational structure that allows it to operate at peak performance. Given the new demands of today's dynamic, fast-paced operational environment, the Armed Forces should enhance this structure by creating Project Management Offices. Furthermore, when a project exceeds a certain budget, when it is especially complex, or when it is considered a priority by the strategic decision maker, the team's project manager (and, when possible, the team members) should work full-time on the project.

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Keywords: Capability, Organizational Structure, Project, Project Management, Portuguese Military Programming Law, Project Management Office.

Resumo

Atualmente as Forças Armadas, no âmbito da LPM, obtêm o armamento e equipamento que lhes permite cumprir as missões através de projetos. Estes projetos são uma maneira chave de criar valor nas Forças Armadas permitindo-lhes assegurar a edificação de capacidades militares, fulcrais para o cumprimento dos compromissos quer nacionais quer internacionais. Por este motivo importa identificar contributos para a revisão do modelo de estrutura organizacional associada à gestão de projetos. Para tal, recorreu-se a uma metodologia de raciocínio indutivo assente numa estratégia de investigação qualitativa substanciada num desenho de pesquisa comparativo. A pesquisa efetuada permitiu concluir que não existe uma estrutura única que sirva para qualquer organização, e que cada instituição deverá escolher a estrutura organizacional que lhe permita operar com o máximo desempenho. Assim, preconiza-se que, face às novas exigências do atual ambiente operacional, dinâmico e com ritmo acelerado, as Forças Armadas deverão robustecer a sua estrutura com a criação de Gabinetes de Gestão de Projetos, e que, quando o projeto supere um determinado patamar financeiro, quando se mostre especialmente complexo, ou seja considerado como prioritário pelo decisor estratégico, seja constituída uma equipa em que, pelo menos o gestor de projeto e desejavelmente os membros de equipa, sejam designados exclusivamente para desenvolverem o projeto.

Palavras-chave: *Capacidade militar, Estrutura organizacional, Projeto, Gestão de Projetos, Lei de Programação Militar, Gabinete de Gestão de Projetos.*

1. Introduction

The Ministry Guidance for the Military Defence Planning Cycle approved by Decision No. 4 of the Ministry of National Defence (MDN) on 31 January 2011 establishes the Military Defence Planning Cycle (CPDM), during which the military capabilities required to define and build a System of Forces (SF) (MDN, 2014).

This guiding directive defines the concept of military capability as a set of functional elements "which are coordinated in a harmonious, complementary way, in order to accomplish a set of operational tasks or effects, which include doctrine, organization, training, materiel, leadership, personnel, facilities and interoperability" (DOTMLPFI). A military capability is considered built only if "all its functional elements are present and included" (MDN, 2014, p. 23657).

The need to build and sustain the capabilities that the Armed Forces (AAFF) require to fulfill their missions is identified through the military defence planning process, which combines military planning (a type of planning based on military capabilities) and resource planning. During this planning cycle, priority capabilities are identified and resources are made available to build and sustain them throughout their life cycle. This priority will determine which military capabilities will be developed at a given time and which

projects are of interest to National Defence, so they can be funded through the Military Programming Law (LPM) (MDN, 2014).

The LPM-2019 was approved by Organic Law No. 2/2019 of 17 June after a review which aimed to align it with the capability planning model of the North Atlantic Treaty Organisation (NATO). The law establishes the public investment to be made in weapons and equipment to modernise and operationalise the SF over three quadrennia, as provided in Art. 14, which states that the law is to be reviewed in 2022 and that the changes will be implemented in 2023 (Assembly of the Republic, 2019).

The Court of Auditors warns that a "capability planning model" that the process more transparent has not been fully implemented yet, and that "due to lack of information, the current model has not effectively harmonised the various components of the capabilities in a way that helps the Armed Forces to achieve their goals (Court of Auditors, 2017, p. 52).

Currently, military capabilities (which include the equipment financed through the LPM and other components) are built by implementing projects. These projects have unique characteristics and goals and require tailored management control models to monitor the status of implementation. However, due to the lack of a systematic and holistic perspective that encompasses "operations, administrative procedures and financial management", standardised Project Management (PM) practices have "only recently been recognised as important by organizations" (Bright Partners, 2016, p. 3).

The PM methodology can be seen as a capability that must be built before it can be used to build the military capabilities planned in the Military Strategic Concept and the SF, which involve the same functional elements or development strands (DS) (see DOTMLPFI in Figure 1).

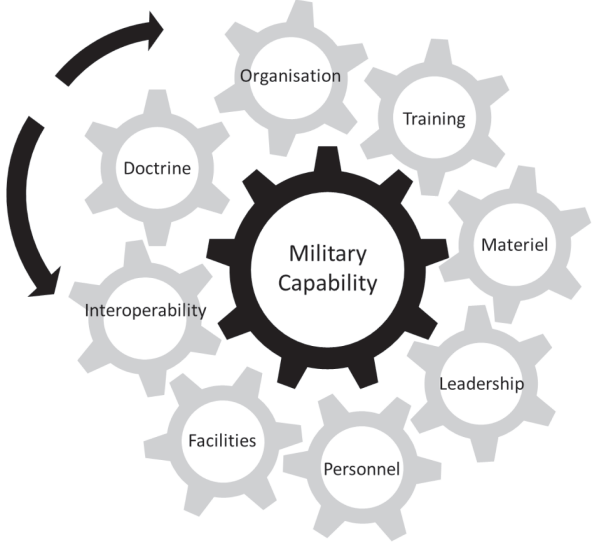

Figure 1 – Dynamic development cycle of a military capability
Source: Adapted from EME (2015).

In October 2010, the MDN made the decision to implement the PM information system Microsoft Enterprise Project Management (MS EPM) at the General Secretariat of the MDN, the General Staff of the Armed Forces (EMGFA) and the branches. The system has been in use since April 2011 (EME, 2015).

This article will analyse the DS Organization of the PM capability used by the Portuguese AAFF (to manage LPM projects) and by international counterparts (e.g. NATO) to identify ways to improve the AAFF's PM organizational model.

The research will be delimited in terms of time, space and concept (Santos & Lima, 2016, p. 44).

In terms of time, the study will analyse the current implementation status of the PM methodology for LPM projects, as provided for in the standards and regulatory documents.

In terms of space, the study will focus on the Directorate General for National Defence Resources (DGRDN) of the MDN (the body directly responsible for PM), the EMGFA and the branches, and compare them to the practices of international counterparts (e.g. NATO) that is, how they use PM to build military capabilities.

In terms of content, this investigation will focus on the implementation of the DS Organization in the process to build a PM capability to manage LPM projects.

Having introduced and delimited the topic, the investigation's general objective (GO) was defined:

GO – To identify aspects that can be improved in the Project Management organizational model used by the AAFF to manage LPM projects.

To achieve the GO, three specific objectives were defined (SO):

SO1 – To analyse the influence of the organizational structure on Project Management.

SO2 – To analyse the model used by the Portuguese AAFF to implement the DS Organization of its Project Management capability.

SO3 – To analyse the Project Management organizational structure of international counterparts (e.g. NATO).

The GO was achieved by answering the following Research Question (RQ):

RQ – How can the Project Management organizational model used by the AAFF's to manage LPM projects be improved?

2. Theoretical and conceptual framework

This article addresses the research domain Complementary Elements of Military Sciences, specifically the sub-domains Organization and Decision-Making Support in Military Management Sciences (IUM, 2016a, p. 2).

This chapter presents the state-of-the-art and key concepts used in the study and outlines the analysis model.

2.1. State-of-the-art and key concepts

During the exploratory phase, a preliminary literature review was carried out to identify works that address the impact of the organizational structure on PM. After this

review, an exploratory interview was conducted with a PM expert from the Army, Major Gil dos Santos, who helped frame the issues under study. This interview was carried out in the exploratory phase to provide a brief overview of the AAFF's PM process (in this case, the Army's).

Several studies and theses have been published on other aspects of PM, such as Dantas' (2011), which looks at the implementation of the LPM from the perspective of PM, and Parcelas' (2018), which focuses on the relationship between information management and PM in the AAFF. A thesis by Esperança (2015) analyses the influence of the best practices recommended by the Project Management Body of Knowledge (PMBOK) on how PM influences the success of information systems.

After reviewing the national studies, the international literature was analysed. One work of particular interest among the vast bibliography on PM is a manual on best PM practices known as "PMBOK Guide" (PMI, 2017).

To better frame the issues under study and to guarantee the rigour that a research article demands, the next section will describe the key concepts that frame the investigation.

The term **organization** refers to the traditional form of organizational structure with defined hierarchies (PMI, 2017, p. 43).

A **Project** is a specific set of processes which unfold into coordinated and controlled activities that aim to achieve a given goal within a defined time frame. It is a one-time event that involves some degree of uncertainty and constraints in terms of costs, time and specifications, which aims to create change in an organization (PMI, 2017, p. 542).

The **Project Manager** is the person appointed by the organization to manage the project and lead the project team (PMI, 2017, p. 52).

The **authority** of the project manager can be defined as the right to allocate project resources, make decisions, carry out approvals, accept deliveries and influence others to work on the project (PMI, 2017, p. 318).

Resource **availability** refers to the project manager's ability to access a set of tangible and intangible attributes which are essential to carry out the project, which include human and financial resources, materials, equipment and time (PMI, 2017, p. 313).

Autonomy refers to the power to take decisions. In this context, it implies the technical organizational knowledge that legitimises the initiative in an interdependent manner (TGI Consultoria, 2012).

2.2. Analysis model

This study followed the model outlined in Table 1.

Table 1 – Analysis model

General Objective	To indentify aspects that can be improved in the Project Management organizational model used by the AAFF to manage LPM projects.
Research Question	How can the Project Management organizational model used by the AAFF to manage LPM projects be improved?

Specific Objectives	Subsidiary Questions	Concepts	Dimensions	Indicators	Data collection techniques
SO1 To analyse the influence of the organizational structure on Project Management	**SQ1** How does the organizational structure influence Project Management?	Types of organizational structures	Authority	Type of authority	Literature review
			Resources	Availability	
			Project Management	Autonomy	
SO2 To analyse the model used by the Portuguese AAFF to implement the Organization of its Project Management capability.	**SQ2** How is the DS Organization Management capability of the Portuguese AAFF?	Implementation of the organizational structure	Authority	Type of authority	Literature review Semi-structured interviews
			Resources	Availability	
			Project Management	Autonomy	
SO3 To analyse the Project Management organizational structure of international counterparts (e.g. NATO)	**SQ3** What is the Project Management organizational structure of international counterparts (e.g. NATO)?	Organizational structure definition	Authority	Type of authority	Literature review Semi-structured interviews
			Resources	Availability	
			Project Management	Autonomy	

3. Methodology and method

This chapter describes the methodology and methods that guided the investigation.

3.1. Methodology

The study used an inductive reasoning methodology supported by a qualitative research strategy and a case study research design (Santos & Lima, 2016).

3.2. Method

This subchapter presents the interviewees, the procedure, and the data collection and data processing tools.

3.2.1. Participants and procedure

The study participants were selected based on their expertise and experience on the topic under study (PM). Semi-structured interviews were carried out with military and civilian personnel who work or have worked in the PM organizational structure of the AAFF or of an international counterpart. The study procedure consisted of conducting nine semi-structured interviews, which took place between January and March 2019. Eight interviews were conducted face-to-face and one was conducted electronically.

3.2.2. Data collection instruments

The data collection techniques used in the study were a literature review and interviews. The literature review covered the main works published on the topic, including studies and articles written by experts which address this field of study or other related fields.

The interview technique was chosen because it allows for an interdisciplinary and complex approach to the topic under study and broadens the scope of the information that can be collected from the representatives of the various agencies involved in the implementation of the LPM and PM. Furthermore, semi-structured interviews allow for open-ended questions and thus strike a balance between flexibility and excessive rigour.

3.2.3. Data Processing Techniques

The interviews were analysed according to the methodology proposed by Guerra (2011), which consists of transcribing the interviews, reading the transcripts, and conducting descriptive and interpretative analyses.

4. Data presentation.

4.1. Project Management and organizational structure

This subchapter provides a definition of organizational structure and describes the different types of structures, their characteristics, and their influence on PM. The PMBOK describes the influence of the organizational structure adopted by the organization on PM.

Projects are becoming an increasingly important tool for change and development in organizations because they can give organizations a competitive edge. PM has been gaining popularity for its potential to improve a project's speed, robustness, consistency and operational excellence (Bouer & Carvalho, 2005, p. 348; Zandhuis & Stellingwerf, 2013, p. 15).

Therefore, companies / organizations should choose an organizational structure that allows them to operate at peak performance. To identify the organizational structure that best suits an organization, the tradeoffs between two key variables are analysed. The variables included in this analysis are "the types of organizational structures that can be implemented and how they can be optimised for a specific organization. There is no single structure that fits all organizations" (PMI, 2017, p. 45).

4.1.1. Organizational structure

According to the PMBOK, there are different forms and types of organizational structures. An organization must account for multiple factors when defining its organizational structure. A project's budget and relative importance are the key elements that influence the organization's decision makers in their analysis. Other relevant factors include the degree of alignment with the organizational goals, the allocation of responsibilities and resources, the project's complexity and the costs involved (PMI, 2017, p. 45).

Ebert & Griffin (2017, p. 215) identify four basic forms of organizational structure that reflect the general trend in most organizations: (i) functional, (ii) multidisciplinary, (iii) matrix, and (iv) international.

In a functional structure, an organization has departments or divisions that have specific goals. This type of organizational structure is effective in small and midsized organizations where the performance of each department depends on the skills of the employees assigned to a given project. The simplicity of this system allows managers to issue clear instructions regarding the project tasks to the people responsible for implementing the project. On the other hand, a disadvantage of this type of organizational structure is that it limits intra-department coordination and communication because employees exclusively work on tasks within their department (Ebert & Griffin, 2017, p. 216). Figure 2 shows an example of a functional structure (the grey boxes represent the teams involved in the project's activities).

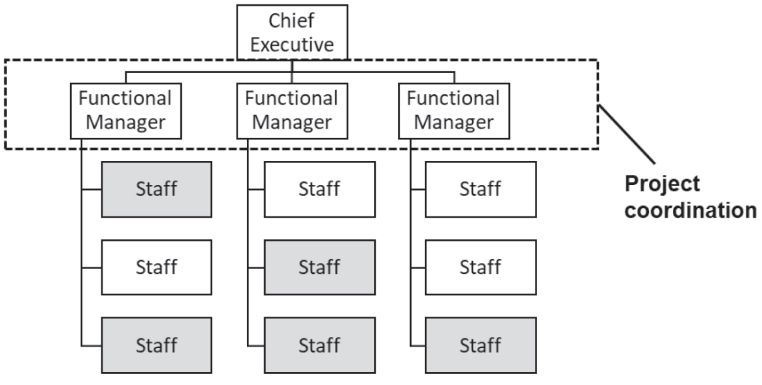

Figure 2 – Functional structure
Source: Adapted from PMI (2013, p. 21).

Coordination between functional departments is generally more complex in larger organizations with many employees and multiple tasks that require both vertical and horizontal interaction. This type of organizational structure is known as a matrix structure (Ebert & Griffin, 2017, p. 217).

The PMI (2013) defines three different types of matrix correlations: weak, balanced and strong.

The features of a weak matrix structure resemble those of a functional structure. The project manager role is performed by a team member, who acts more as a facilitator or coordinator than a formal project manager. In this type of structure, there is no way to allocate human resources exclusively to a project because the functional team and the project team have the same team members, with each team member reporting to his or her functional manager. Figure 3 shows an example of this type of structure.

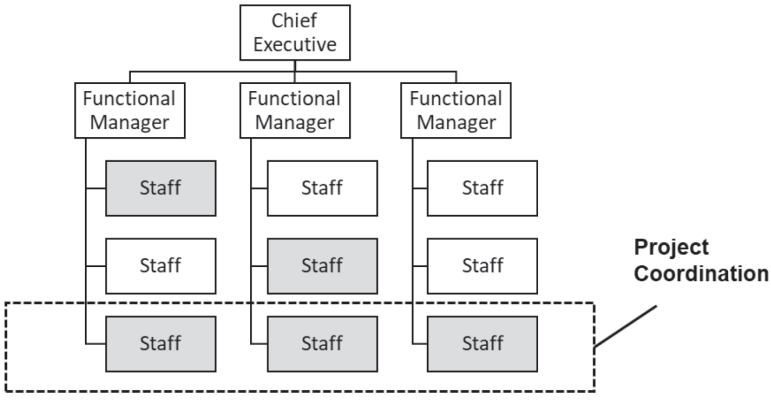

Figure 3 – Weak matrix structure
Source: Adapted from PMI (2013, p. 22).

In a balanced matrix structure the project manager is not the same person as the functional manager and while the manager is assigned to the project on a full-time basis, the project team members remain under the authority of their functional managers and work part-time on the project. This conflict is present in all matrix structures; however, this structure's double chain of command is particularly prone to it. This type of structure is shown in Figure 4.

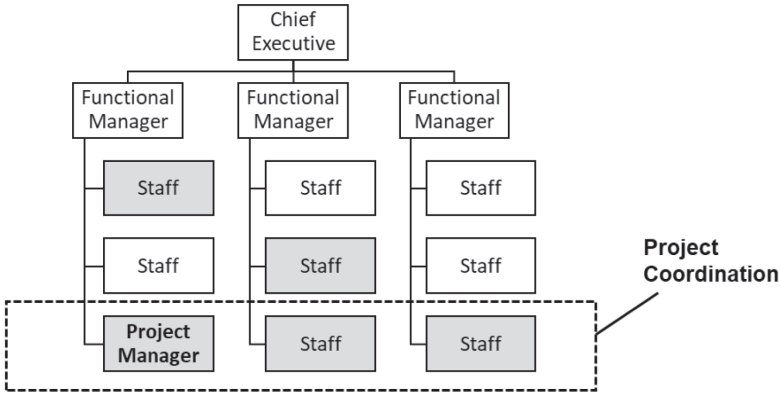

Figure 4 – Balanced matrix structure
Source: Adapted from PMI (2013, p. 23).

In a strong matrix structure (Figure 5), project managers work on a project full-time and have no other roles. Usually, a specific area is created to integrate project managers. The organizations that adopt this structure give priority to projects over other functional activities in terms how they allocate resources. Therefore, project managers have more authority and autonomy in this type of structure. This authority includes budgeting the project and the authority to allocate resources.

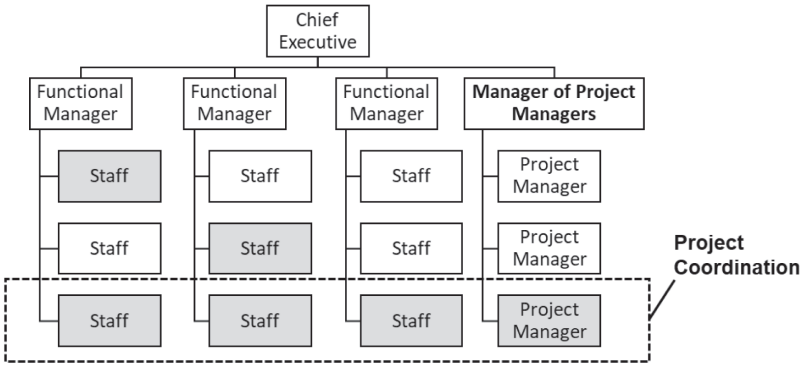

Figure 5 – Strong matrix structure
Source: Adapted from PMI (2013, p. 23).

At the opposite end of the spectrum to the functional structure are projectized structures. This type of structure has full-time team members and the project manager has almost total authority to allocate resources.

Figure 6 shows an example of a projectized structure (the grey boxes represent the teams involved in the project activities).

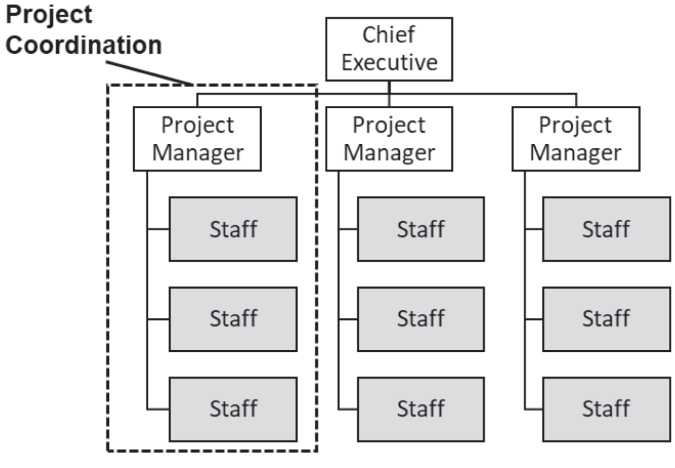

Figure 6 – Projectized structure
Source: Adapted from PMI (2013, p. 24).

Table 2 summarises the different types of organizational structures and their influence on projects.

Table 2 – Influence of Organizational Structures on Projects

Type of organizational structure	Project characteristics					
	Work groups organized by:	**Project manager authority**	**Project manager role**	**Resource availability**	**Who manages the project budget?**	**Administrative staff in the project team**
Organic or simple	Flexible; people working side by side	Low or none	Part-time; may or may not be a formal position such as coordinator	Low or none	Owner or operator	Few or none
Functional (centralised)	Type of activity (e.g. engineering, manufactoring)	Low or none	Part-time; may or may not be a formal position such as coordinator	Low or none	Functional manager	Part-time
Multidivisional (roles can be replicated in each division with little centralisation)	Product; Production processes; Portfolio; Programme; Geographic area; Type of customer.	Low or none	Part-time; may or may not be a formal position such as coordinator	Low or none	Functional manager	Part-time
Matrix–weak	Role	Low	Part-time; integrated in another role, rather than a formal position such as coordinator	Low	Funtional manager	Part-time
Matrix – balaced	Role	Low to moderate	Part-time; may be integrated in another role as a skill, and may or may not be a formal position such as coordinator	Low to moderate	Mixed	Part-time
Matriz- strong	By role, with a formal project manager position	Moderate to high	Formal position, full-time	Moderate to high	Project manager	Full-time
Geared towards projects (complex, hybrid)	Project	High to almost total	Formal position, full-time	High to almost total	Project manager	Full-time
PMO	Mix of other types	High to almost total	Formal position, full-time	High to almost total	Project manager	Full-time

Source: Adapted from PMI (2017, p. 47).

4.1.2. Brief overview and answer to SQ1

There are different forms and types of organizational structures. These include functional, matrix and projectized structures, which differ in terms of the manager's role and in terms of authority, autonomy and resource availability.

The answer to SQ1 is that there is no single structure that fits all organizations, and that organizations should choose and implement the organizational structure that allows them to operate at peak performance.

4.2. Project Management in the Portuguese Armed Forces

This subchapter analyses the PM organizational structure implemented in the MDN, the EMGFA and the branches. The analysis is based on the literature review and on the content analysis of interviews with military and civilian experts working in Portugal.

4.2.1. Ministry of National Defence

The MDN (through the DGRDN) plays a crucial role in coordinating and monitoring the projects developed through the LPM, especially with regards to the materiel and financial DS of military capability development. To that end, the MDN has effective, comprehensive management and decision-support capabilities, which it uses to allocate the resources at its disposal in a rigorous, streamlined manner.

The organizational structure of this key service of the MDN comprises seven core organic units or Service Directorates, while the flexible structure comprises sixteen Divisions and a multidisciplinary team. The DGRDN's internal organization uses a matrix structure model for areas of activity which, due to their complex or intersectional nature, must be developed through projects (Council of Ministers, 2015).

Since 2008, to address the challenges of monitoring the physical and financial implementation of the LPM, the MDN has made a coordinated effort to encourage the development and implementation of a management model or solution aligned with the best practices in PM and adapted to the legal and cultural requirements of the military. By determination of the MDN, the EMGFA and the AAFF branches use MS EPM software to manage the projects funded by the LPM. This allows for permanent, updated and secure information exchange between all stakeholders, including project managers (Bright Partners, 2016).

The DGRDN participates in the team responsible for monitoring and coordinating the LPM projects. This three-person team is integrated in the Planning and Programming Division, which answers to the EMGFA and the three branches. Furthermore, in some joint projects, the project manager reports to the DGRDN and the project team members report to the branches (J. Freitas, face-to-face interview, 8 February 2019).

4.2.2. Armed Forces General Staff

The EMGFA uses the same PM software (MS EPM) as the the branches and the MDN to plan and monitor of the activities associated with the implementation of the LPM.

The organizational structure of the EMGFA's PM capability does not include an official Project Management Office (PMO). A proposal for the creation of the "Project Management Capability Development Structure" at the EMGFA is pending approval. This structure will ensure the consolidation, support and development of the PM capability and should have the authority and responsibilities that enable it to fulfill this role (CEMGFA, 2018).

CDR Leston Pereira from the RSTI/DIRCSI[2] has acted as a PMO since 2014, to ensure the process is carried out in an organized manner. This includes using the MS EPM information system and providing support to project managers internally assigned to LPM projects under the aegis of the EMGFA (M. Pereira, face-to-face interview, 01 February 2019).

Currently, project managers are appointed by common agreement of the Heads of Directorates and Divisions. The vast majority of these project managers are officers in their respective services, who take on these roles in addition to their regular duties. There are no project teams and the appointed PM is responsible for monitoring the process implementation using MS EPM (M. Pereira, op. cit.).

As part of the restructuring of the EMGFA, which aimed to optimise resources and streamline planning processes and work procedures, the decision was made to create a "Department for Innovation and Transformation tasked with promoting new processes, collaborative tools and operational capabilities, and with developing the PM capability, among other initiatives" (EMGFA, 2018, p. 3).

The organizational structure of the EMGFA's PM capability is considered functional (centralised) because its "resources are organized according to departments. The resources allocated to each department are the responsibility of a single manager. Moreover, each area has people who share similar expertise and skills" (M. Pereira, op. cit.).

4.2.3. Portuguese Navy

The Navy's PM capability is essential to link the strategic planning phase to the operational and monitoring phases (EMA, 2013, p. 1.2). This capability is not limited to PM and includes the components presented in Figure 7.

[2] Information Systems and Technology Department of the Directorate of Communications and Information Systems.

Figure 7 – Components of the Navy's Project Management Capability DS
Source: Adapted from Ascenso (2019).

The Navy used MS EPM to build its PM capability, which it used to operationalize the processes for planning, implementing and monitoring LPM projects. Later, it extended this use to strategic management, management of ongoing operational and maintenance activities, and portfolio management. To that end, the Navy created project management offices (PMO) to serve as support structures (EMA, 2013, p. 1.1). As shown in Figure 8, the Navy's PM has two strands, regulation and exploitation. The position of Executive Director is held by the Superintendent of Information Technology, who reports to the Chief of Staff of the Navy. Top management includes the strategic PMOs within the EMA. The structure is supported by ten PMOs from supervising bodies (Sectors / Superintendencies) and, at the level below, by one PMO from each implementing body (Units / Directorates) (C. Ascenso, face-to-face interview, 08 March 2019).

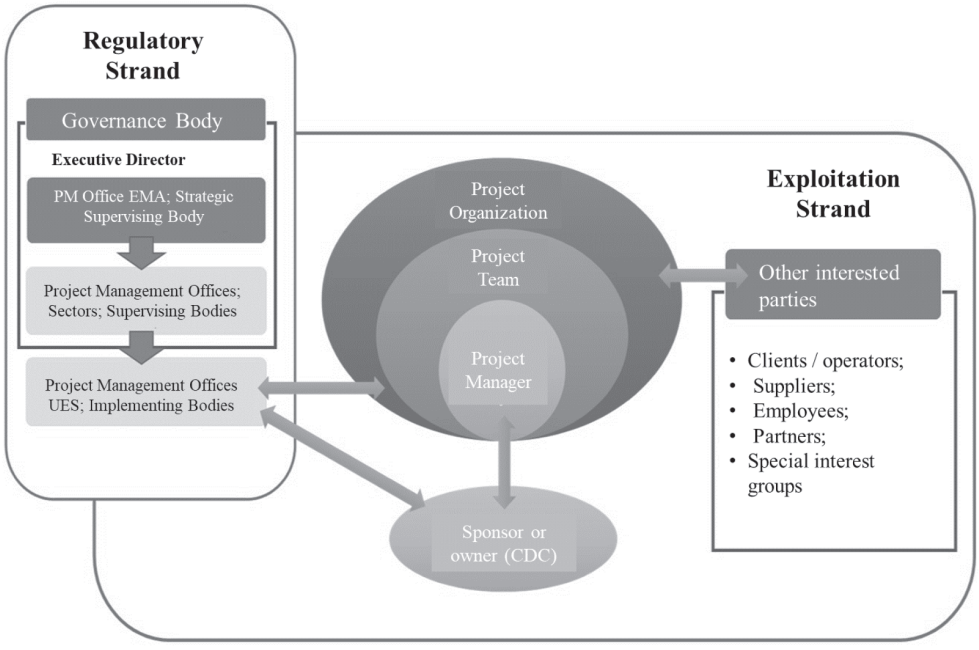

Figure 8 – Organization of the Navy's Project Management Capability
Source: Adapted from EMA (2013, p. 3.1).

As shown in Figure 9, PMOs are part of the organization's hierarchical structure and act as a single, functional, agile, effective and adaptable body dedicated to the regulatory and consolidation aspects of the PM capability.

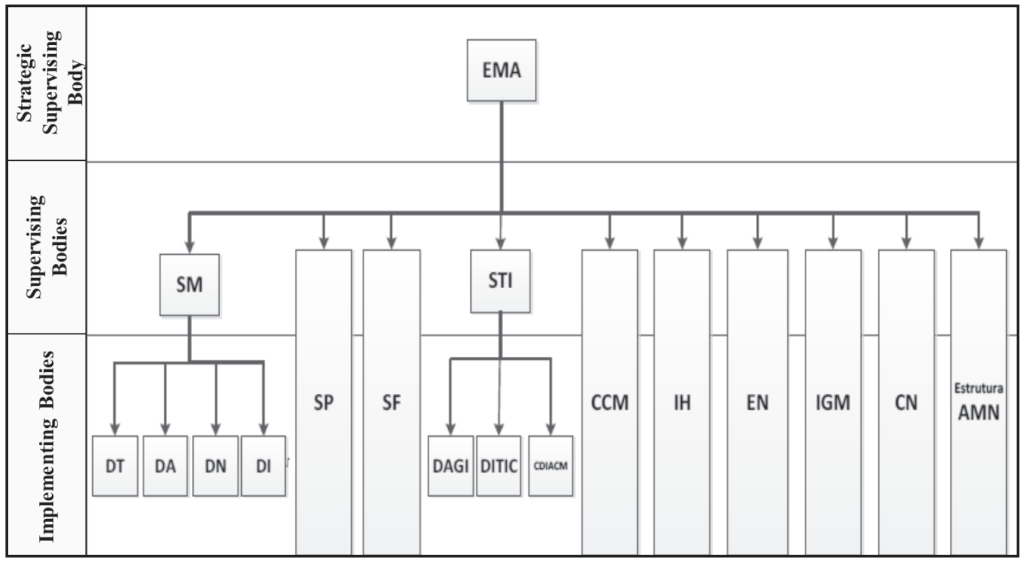

Figure 9 – Structure of the Navy's Project Management Offices (PMOs)
Source: Adapted from Ascenso (2019).

The manager is usually appointed to the project in a double-hatting system and the project team members report to their functional managers and work part-time on the project. For specific projects[3], the Navy uses a different structure in which the above roles are taken on full-time (C. Ascenso, op. cit.).

4.2.4. Portuguese Army

The Army uses the PM methodology to plan, implement and monitor its activities, to implement its strategy and build its capabilities, as well as for operation and maintenance (EME, 2015, pp. 3-3).

By introducing the PM methodology, the Army has increased its organizational commitment at all levels to plan, implement and monitor its PM capability. Therefore, this branch already has the recommended PM organizational structure, which includes a clear chain of command and formal roles for the project team, the project manager, the PMO and the governance body, as shown in Figure 10 (EME, 2015, pp. 3-4).

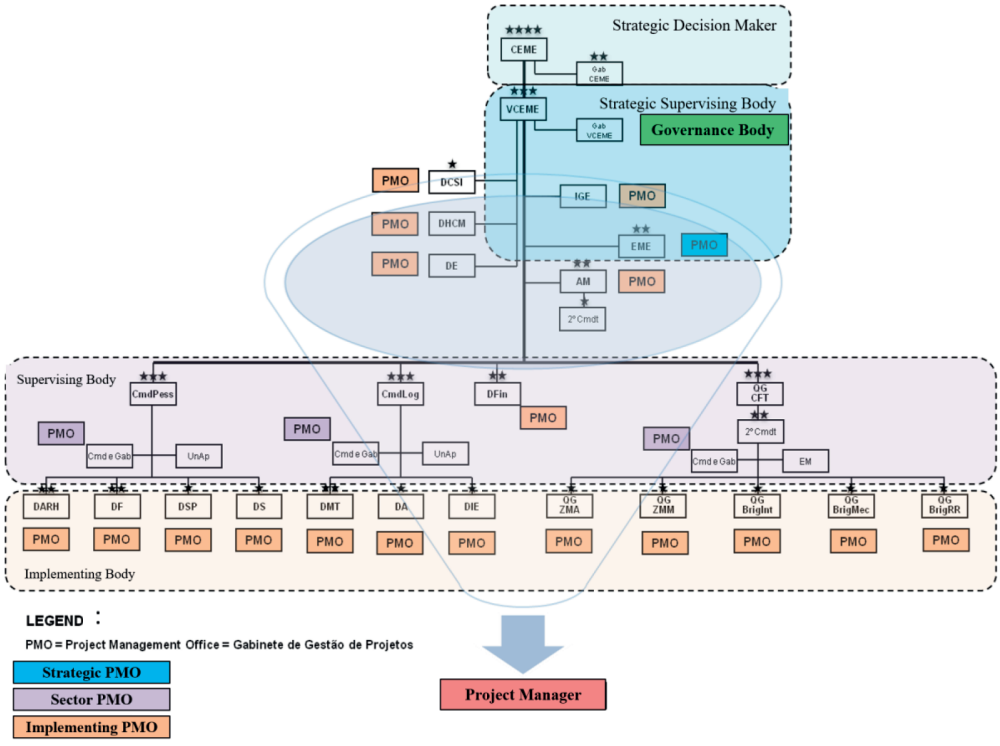

Figure 10 – Organization of the Army's Project Management Capability
Source: Adapted from EME (2015, pp. 3-5)

[3] The frigate half-life modernisation project, which currently has 27 full-time team members (to be scaled back to 16); and the project to design the mission to monitor the manufacture of ocean patrol vessels, which has a four-person team.

By choosing this structure, the Army aimed to avoid parallel structures and conflicting chains of command. The strategic, sector and implementing PMOs who take on dual roles do not require any special resources because those resources are already available in the existing structures. The project managers and team members take on additional roles (EME, 2015, pp. 3-5).

The Army believes that creating a PMO is crucial for the PM process. When the current standards were implemented, the staff numbers for the structures who took on the role of PMO remained the same (EME, 2015, pp. 3-6).

Currently, the PM capability (but not the planning capability) is managed by the Communications and Information Systems Division (RCSI) of the Force Planning Division, which functions as a PMO. The planning is carried out by the Capabilities Division in coordination with the RCSI. The PM standards are currently being reviewed to streamline the information-level structure by separating the Army's PM capability from its Strategic Management (P. Santos, face-to-face interview, 15 January 2019).

Thus, the Army's PM organizational structure is a weak matrix structure. For S. Sousa (face-to-face interview, 30 January 2019) "considering the current personnel and financial constraints, the structure serves its purpose".

The main advantages of this structure are the proximity between the project manager and the end user and the fact that the Army knows how the project deliverables will be used. However, this type of organization makes it difficult for "project managers to have a broad view of the project because they also have to focus on their other duties. The Army does not have a structure dedicated to these issues, which makes the work somewhat more difficult" (S. Sousa, op. cit.).

4.2.5. Portuguese Air Force

At the time this study was conducted, the Portuguese Air Force (PoAF) did not have any internal rules or regulations regarding the organization of its PM capability (R. Veloso, face-to-face interview, 14 March 2019).

However, the Programme Analysis and Management Division of the Planning Division of the Air Force General Staff (EMFA) acts as an informal PMO for LPM projects, liaising between project managers and external agencies such as the DGRDN. This division is responsible for reporting on the implementation of the LPM to the MDN (R. Veloso, op. cit.).

The PoAF recently created a Capability Manager[4] position. This manager is responsible for managing a portfolio of projects and is one organizational level above the project managers, similar to a sector supervising PMO.

[4] One manager per capability, that is, a total of 12 at the time of this study.

Veloso (op. cit.) adds that the Planning Division of the EMFA has the same responsibilities as a PMO, inasmuch as it is responsible for monitoring and controlling PM at the CPDM. Therefore, it can be inferred that it acts as a strategic supervisor PMO (as is the case in the other branches) and that, like the General Staff of the other branches, the EMFA is the governing body of the PoAF reporting to the strategic decision-maker, that is, the Air Force Chief of Staff (CEMFA).

Figure 11 shows the inferred organizational structure of the PoAF's PM capability.

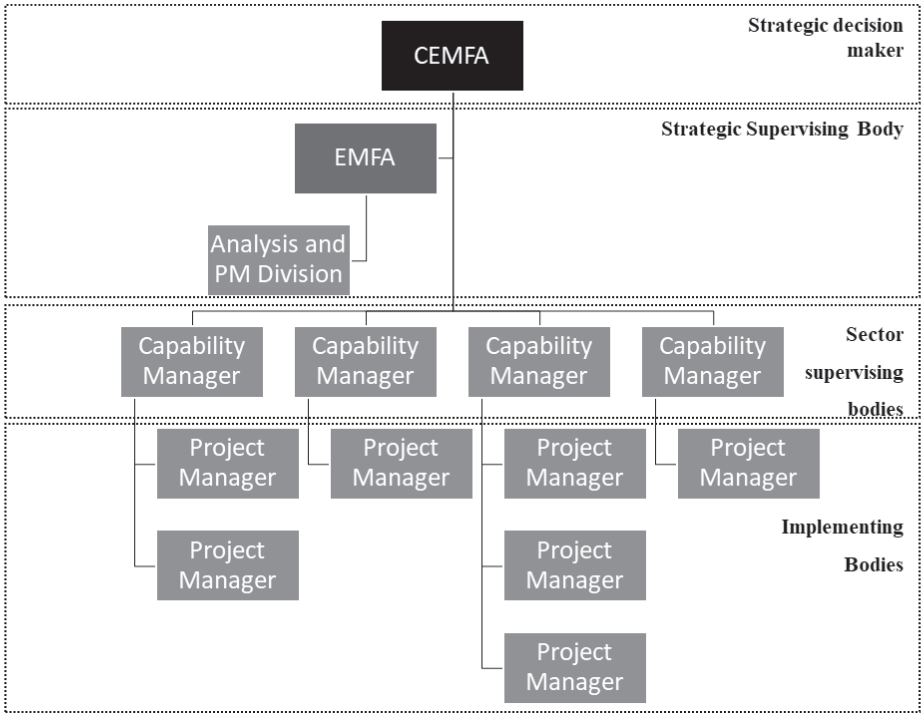

Figure 11 – Inferred organization of the PoAF's Project Management capability

The project manager, capability manager and PMO roles are performed in a double-hatting system (R. Veloso, op. cit.).

4.2.6. Brief overview and answer to SQ2

The MDN, the EMGFA and the branches have different types and are at different stages of development of the PM organizational structure.

The EMGFA structure can be considered functional (centralised), while the DGRDN and the branches tend to use weak matrix structures. On the other hand, the Navy's PM methodology is at an advanced stage of development, and is unique in that it appoints project managers and team members to work full-time on particularly complex or important projects.

4.3. Project Management in international counterparts

Based on the literature review and on the content analysis of the interviews with military experts from international agencies, this chapter will present the PM organizational structure at NATO Allied Command Transformation (ACT) and NATO Support and Procurement Agency (NSPA).

4.3.1. NATO

NATO's modern defence posture is a combination of two key pillars: state-of-the-art weapons systems and platforms and forces trained to work together in an integrated manner. Therefore, investing in the right capabilities is an essential part of defence investment (NATO, 2018).

The document that regulates NATO's Capability Planning is the NATO Defence Planning Process (NDPP), which aims to harmonise the defence planning activities of member countries with those of the Alliance to ensure the military forces and capabilities it needs to carry out its missions and tasks, in order to meet its military level of ambition (NATO, 2018).

The NATO Security Investment Programme (NSIP) is NATO's long-term common fund investment programme. It is one of NATO's three[5] pillars of resources, which are combined to strengthen NATOs' capabilities based on the needs identified by the NDPP (ACT NSIP Branch, 2014).

The key elements of the NSIP are referred to as Capability Packages, which comprise several projects. The number of projects in a Capability Package ranges from one (Stand Alone Project) to more than 100 projects, with some requiring more complex implementation at multinational level (or even in all NATO countries). The NSIP is both a programme and a branch of the ACT (ACT NSIP Branch, 2014).

NATO's *Bi-SC Directive 085-001, Capability Package, Edition 5* (2017) is the framework document for the capability building process using PM. The document contains a set of organizational standards and elements common to all projects (R. Mendes, face-to-face interview, 27 February 2019).

The initial work by the research team to identify the need for a new Capability Package is followed by the first formal stage of the process, or "initiation". In this stage, the need to develop a Capability Package is formally accepted by the Capability Package Board (CPB). This process defines the three main stakeholders in processing a Capability Package: the Mission Sponsor (MISPO), who is responsible for delivering and defining the requirements and criteria that will be used to assess both Initial Operational Capability and Full Operational Capability, including delivery dates; the Capability Package Coordinator (CAPCO), who is the single point of contact for the development of the Capability Package, and who is responsible for forming and leading the Capability Package development team and for elaborating a consolidated proposal

[5] The other two pillars are human resources and operation and maintenance.

detailing the investment, operational costs and human resources required over time; and the Operational Coordinator (OCO) from Supreme Headquarters Allied Powers Europe (SHAPE), who is tasked, both as client and representative of the end-user, with ensuring that the delivered product fits its purpose and meets all military requirements (ACT NSIP Branch, 2014). Figure 12 shows the inferred organizational structure of the ACT's PM process.

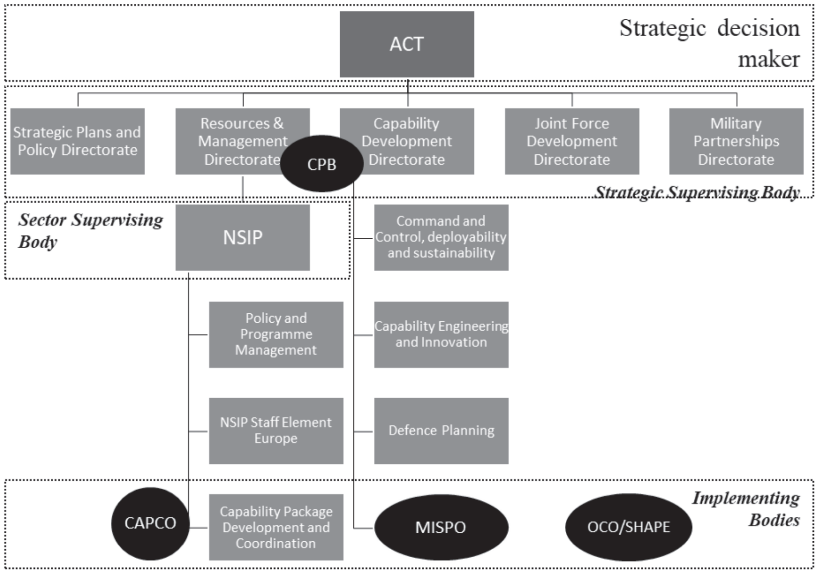

Figure 12 – Inferred PM organizational structure used by NATO

R. Mendes (op. cit.) states that this structure is being reviewed to introduce a PMO under the NSIP (for CAPCO infrastructure project managers), among other changes.

4.3.2. NSPA

The NSPA's PM organizational structure has two strands, Governance and Operationalization / Use. The Project Management Working Group (PMWG) at Headquarters (HQ) is responsible for the documentation that regulates the implementation of PM in the Agency. The Operationalization / Use strand includes a Strategic PMO at the same level as the HQ, however, the NSPA does not have a formal PMO. That is, the Programmes have a PMO who is the focal point for the different projects, while Category A projects (the highest level projects), due to their complexity, are reported to the HQ PMO. The remaining projects are conducted exclusively through the Programmes (C. Pousa, email interview, 5 April 2019). Figure 13 shows the hierarchical levels for each project category.

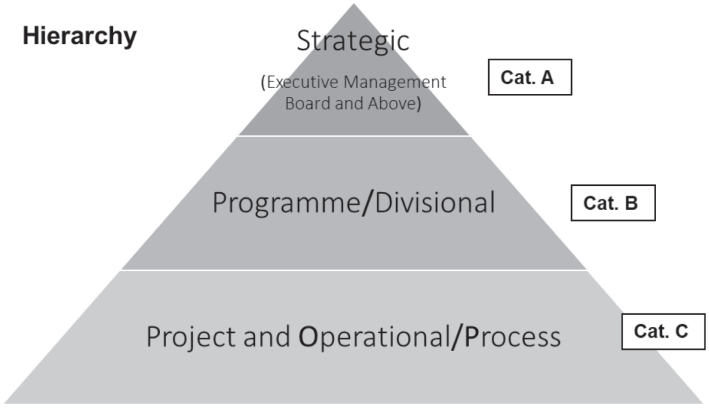

Figure 13 – NSPA hierarchy and project categorisation
Source: Adapted from NSPA PMWG (2019).

Table 3 contains the typical organization and documentation produced for each project category.

Table 3 – Project categories A/B/C: Documentation and typical organization

	Cat. A	Cat. B	Cat. C
Portfolio *Manager*	Director	Programme Offices and Divisions (POD) Chief	POD Chief
Project Manager	POD chief or delegated senior manager	Branch Chief or delegated manager	Branch Chief or delegated manager
Gestor de Projeto Project Manager (based on experience / qualifications)	POD chief or delegated manager	Branch chief or delegated senior officer	Section Chief, Technical Officer or delegated Senior Technician
Organization of the Project Team	Project Manager Technical expert(s) Logistics Public procurement contracts Finances IT (as needed) Client (when applicable)	Project Manager Technical expert(s) Logistics Public procurement contracts Finances IT (as needed)	Project Manager Technical expert(s) Logistics Public procurement contracts
Documentation Project Mandate Project Management Plan Highlight Report Project Schedule Requirements Specification Exception Report End Project Report	 Mandatory Mandatory Mandatory Mandatory Mandatory When requested Mandatory	 Mandatory Mandatory Mandatory Mandatory Mandatory When requested Mandatory	 Mandatory When requested When requested Mandatory When requested When requested Mandatory

Source: Adapted from NSPA PMWG (2019, pp. 19-20).

However, the NSPA is not the agency that funds the project budget because the project belongs to the client (member nation). The Armed Forces, on the other hand, can and should change the way in which projects are categorised by making reporting to the top structure mandatory regardless of the project budget.

According to C. Pousa (op. cit.), the NSPA uses a strong matrix organizational structure for Cat. A and Cat. B projects and a balanced matrix for Cat. C projects.

The project manager has a high degree of authority in all project categories, and, when needed, the PM managers will communicate with and take direction from Board and Corporate (C. Pousa, op. cit.).

4.3.3. Brief overview and answer to SQ3

The NATO capability building processes include PM and are conducted through the NSIP using a complex organizational structure with multiple stakeholders, that is, a weak matrix structure. Due to this high level of complexity, the structure is being reviewed to introduce, among other changes, a PMO who liaises with the project managers.

On the other hand, the NSPA is a highly specialised organisation that tends to adopt a strong organizational matrix. Furthermore, this agency has an adaptable and flexible structure that depends on a projects' categorisation.

Based on the analysis of the collected data, this chapter discusses the results and identifies a set of measures to answer the RQ.

4.4. Analysis of interviews

Having analysed the theoretical framework provided by the PMBOK, and having examined the PM organizational structure used by the AAFF and by foreign benchmark organizations, the next section will analyse the opinions of experts regarding the most suitable system for the AAFF, based on a set of indicators, from which measures will be drawn. Table 4 presents the key ideas proposed by the interviewed experts.

Table 4 – Key ideas for indicators proposed by the interviewed experts

Indicador	Ideias-Chave
Authority and autonomy	High autonomy, both administrative and financial, since autonomy will lead to some degree of authority, which is crucial when building joint capabilities.
	The project manager should not have financial authority because the LPM is a multi-annual law with a predefined budget; The project manager should only have the authority to choose and coordinate the team and to manage the project's technical aspects; The project manager should have autonomy during the project's life cycle, but should always report to the PMO or sponsor.
Resource availability (manager)	Human resources (including legal and financial aspects); Computer resources (information systems); Financial resources required to complete the project.
Manager's role	Full-time (ideally, considering the complexity of the projects under the LPM; however, due to the shortage of human resources this will likely not be possible).
Resource availability (project team)	The same as for the Project Manager, albeit on a smaller scale.
Team Skills	Expertise and technical skills relevant to the project; PM training; Teamwork.

Therefore, according to these experts, there are two different views regarding the authority and autonomy of the AAFF's project managers. Some representatives from supervising bodies believe that the project manager should have a high level of authority (if not almost total), while the experts from the branches argue that project managers should have low to moderate authority and no authority with regards to budgeting.

In terms of resource availability, the experts agree that it should be moderate to high, both for the project manager and for the team members.

As for the role of the project manager, the experts agree that it should be a full-time role. However, while this may be desirable, the current shortage of human resources and the increasingly demanding nature of the missions assigned to the AAFF make this solution unlikely.

Finally, with regards to the team's skills, in addition to the technical skills relevant to the project, team members should also have PM training so they can collaborate efficiently with the manager.

4.5. Proposals to improve the PM organizational structure

As mentioned in subchapter 4.1, there is no ideal PM organizational structure that fits all organizations. Organizations should choose a structure that allows them to perform better and more efficiently. As such, the following measures are descriptive rather than prescriptive.

Having analysed the key ideas proposed by the experts and the changes they believe are necessary, the AAFF should adopt either a balanced matrix or a strong matrix PM organizational structure. This is in line with the theory that these matrix types are better suited to large organizations where coordination between departments is more complex due to the large number of human resources and tasks to be accomplished.

Thus, a key measure to review the organizational model is to create a PMO at the

DGRDN, the EMGFA and the Air Force, and to enhance the offices that already formally exist in the Army.

Hierarchically, these PMOs should be part of the strategic supervising entity and have access to the strategic decision maker. Their goal should be to promote and improve PM by adopting methodologies that facilitate problem solving, minimise risks and achieve high levels of efficiency and effectiveness in PM. To that end, these roles should be taken on full-time and should include the following responsibilities: (i) aligning projects with the organizational strategy; (ii) performing portfolio analyses; (iii) developing PM standards, methods and processes that enhance applicability; (iv) overseeing and monitoring projects; (v) training managers and members of project teams; (vi) ensuring uniformity in the management of organizational projects according to best practices; (vii) contributing to the lessons learned working with other agencies to improve processes.

Figure 14 outlines the roles performed and services provided by the PMO.

Figure 14 – PMO Roles & Services
Source: Adapted from Ascenso (2019, p. 6).

A PMO should be staffed by highly experienced professionals with at least ten years of experience, on average. The vast majority of the staff should have a Project Management Professional (PMP) certification or a certification from the International Project Management Association (IPMA). A typical PMO staff comprises nine people (Garcia, 2018).

However, the PMOs at the MDN, the EMGFA and the branches should have (at

least) the staff numbers required to take on the roles recommended by Zandhuis and Stellingwerf (2013, p. 55) in accordance with ISO 21500, that is, a PMO Head, a Project Advisor and a Project Controler.

The second aspect that should be reviewed in the organizational model refers to tailoring the project team to the complexity and cost of the projects to be developed, as already happens in the NSPA and in the Navy.

Therefore, this study proposes that, in all AAFF services, when a project exceeds a certain budget, when it proves especially complex, or when it is considered a priority by the strategic decision maker, a team should be set up in which at least the project manager (and desirably the team members) are assigned to the project on a full-time basis.

This proposal is in line with the Court of Auditors recommendation (2017) that "the tasks assigned to all bodies involved in the investment projects registered in the LPM" should be clarified, especially those of the person who will take on the role of "project manager" in exclusivity. This will make it possible to "effectively monitor the process in all its dimensions (legal, material, financial, etc.) without forgoing operational involvement by other agencies" (EME, 2015, pp. 1-8).

Other complementary measures that may be taken are: (i) holding PM Days with the participation of all the members of the MDN, EMGFA, Navy, Army and Air Force PMOs, as well as invited external entities, to share experiences, exchange knowledge, standardise procedures, enhance networking, introduce innovative practices and promote continuous improvement; (ii) participating in the Bright Challenge[6], an event aimed at the international project managers community that combines practical training on the PM simulator SimulTrain[7] with friendly competition to foster and promote networking. The Bright Challenge brings together teams from several organizations, both private and public, from all sectors of activity (Bright Partners, 2019).

The PMO staff should participate both in the GP Days and in the Bright Challenge, as this will consolidate the maturity of the PM organizational structure, and improve the motivation, recognition, excellence and public awareness of the AAFF's capabilities.

4.6. Brief overview and answer to the RQ

The interviewed experts agree that the PM organizational structure of the AAFF should be enhanced, which is in line with the theory that large organizations with more complex coordination between departments should adopt strong matrix structures due to the high number of human resources and tasks to be accomplished.

Thus, the main aspect to review in the organizational model is to create PMOs at the DGRDN, the EMGFA and the Air Force, and to enhance the offices that already exist in the Army. These PMOs should comprise (at least) the PMO Head, the Project Advisor and the Project Controler.

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[6] The Navy won the general competition in 2017 and the Cost Management and Risk Management categories in 2018.
[7] A popular simulator used for project management training created by Swiss company Sauter Training & Simulation (STS, 2019).

5. Conclusions

This research article examined the development strand Organization of the AAFF's PM capability and presented proposals to review the current model in order to improve the AAFF's project management processes.

The research question was broken down into three subsidiary questions. Having answered those questions, the general objective was considered achieved. This investigation used an inductive reasoning research methodology to observe a phenomenon and generalise it to a class of events based on prior knowledge of the concepts and dimensions under analysis. This resulted in the formulation of common proposals.

First, an exhaustive review of the literature was carried out to collect data. This review included published works and studies directly or indirectly related to organizational structure and PM, and was complemented by exploratory interviews that helped frame the object of study.

Having reviewed the literature, the study analysed the influence of organizational structures on PM. Two data collection techniques were used to characterise and analyse the PM organizational structure adopted by the AAFF to manage its LPM projects: a review of the literature and the guiding documents and standards of the AAFF, and semi-structured interviews with project managers and PMO representatives from the three branches, the EMGFA, the MDN and from international counterparts, specifically ACT/NATO and NSPA. The data was analysed to identify any needs and gaps and to determine the type of structure that the AAFF should adopt to enhance its PM processes.

The RQ was answered by analysing and discussing the findings throughout the previous chapters, and by drawing conclusions that constitute this study's contributions to knowledge.

The data presentation chapter provided an answer to SQ1 by analysing how the organizational structure influences the PM capability.

There are different forms and types of organizational structures, and each influences the PM capability in a different way. These structures include functional, matrix and projectized structures that differ in terms of the manager's role, authority, autonomy and access to resources.

As an ideal structure that fits all organizations does not exist, organizations should choose the organizational structure that allows them to operate at peak performance. The final structure of an organization is always unique because of the multiple variables that must be accounted for. The type of structure adopted should account for several factors, including how the structure aligns with the organizational goals, how responsibilities are distributed, the level of authority, access to resources, costs and location of physical infrastructure.

The answer to SQ2, which analyses PM in the National Defence sector, is that the PM capability is a key link between the strategic formulation phase and the implementation and monitoring phases, and that it will change the organization by building the military capabilities provided by the LPM projects.

The MDN, the EMGFA and the Branches have different types of PM organizational structures, at different stages of implementation. In the initial stage of development of this capability for LPM projects, MS EPM software was used to enable standardised communication between the various stakeholders. In the AAFF, the roles of project manager and project team member are usually part-time, and, since LPM projects already have a fixed

implementation budget, managers have no autonomy in this regard.

The EMGFA structure can be considered functional (centralised), while the DGRDN and the branches tend to use weak matrix structures. On the other hand, the Navy's PM methodology is at an advanced stage of development, and is unique in that project managers and team members work full-time on particularly complex or important projects.

The Navy's PM capability has two strands, regulation and exploitation. The regulatory strand consisted in implementing the structure of the PM capability, while the exploitation strand has different actors or stakeholders with different interests and levels of involvement in the definition, conduct, monitoring and control of the project's implementation.

The answer to SQ3 is that NATO uses PM in its capability building processes, which are implemented through the NSIP, and that it uses a complex organizational structure with multiple stakeholders, that is, a weak matrix structure. Due to this high level of complexity, the structure is currently being reviewed to introduce a PMO to liaise with the project managers of infrastructure-related projects, among other changes. On the other hand, the NSPA uses a strong matrix organizational structure for projects with large budgets and a balanced matrix for projects with budgets up to €5 million.

The answers to the SQs provided the answer to the RQ, which consists in the proposals to review the organizational model of the AAFF's PM capability.

Thus, the main aspect to review in the organizational model is to create PMOs at the DGRDN, the EMGFA and the Air Force, and to enhance the offices that already exist in the Army. These PMOs should comprise (at least) the PMO Head, the Project Advisor and the Project Controler.

Organizations tend to go through an evolutionary process in which the PMO encourages the institutionalisation of best PM practices. In organizations at a more advanced stage of the PM implementation, PMOs take on roles with greater responsibility and monitor projects with significant impact on the strategic objectives.

One proposal that can be implemented across the AAFF is to set up a team with a full-time project manager (and full-time team members, when possible) for projects that exceed a certain budget, for particularly complex projects, and for projects considered a priority by the strategic decision maker.

Other complementary measures that can be taken are holding PM Days and participating in events that promote best practices in PM, such as the Bright Challenge.

The mission of these PMOs, and of the other elements that comprise the organizational structure of the PM capability, is to create a common standards and guidelines that enable the successful completion of quality projects using the AAFF's PM capabilities.

This study has **contributed** to broaden the AAFF's knowledge about the organizational aspects of PM and their influence on proactive, integrated, rigorous and efficient management.

Projects, especially those funded through the LPM, provide the AAFF with the means to make the changes required to fulfill their ongoing and evolving missions. Projects are an important way to improve and add value to organizations. In today's dynamic and rapidly changing operational environment, military leaders have to manage increasingly tight budgets and deadlines, with fewer resources, while keeping up with technological change. Therefore,

the type of PM organizational structure adopted should be effective and efficient, and should be seen as a strategic asset for military organizations (on the same level as human resources).

This article is relevant inasmuch as it advances the knowledge on PM organizational structures and suggests objective improvements to review the organizational model.

As for the benefits of implementing these proposals, a PMO will make it possible to meet the increased need for coordination within the organization and balance the organization's priorities through the use of portfolio management. PMOs have an increasingly greater impact on organizational success and, as technology evolves and organizations seek to innovate themselves, PMOs must also evolve in order to remain relevant and create value for institutions. This study's proposals will prove particularly useful when the number of projects managed by the organization increases, as this will also increase the risk of failure. Given the current scarcity of resources, these projects must be managed efficiently. The PMO acts as a mediator who knows how each project serves the organization's strategy and ensures that resources are allocated effectively to minimise the risk of failure.

The main **limitation** of this study is that, while the organizational structure has a relevant role, it is only one of the factors involved in the implementation of PM in the AAFF. PM is a complex capability that is about more than simply structure or procedures. Therefore, a holistic approach is needed to successfully develop and implement it.

Future studies should establish a research avenue that focuses on analysing organizational culture and its influence on PM. It would also be of interest to study the impact of PM on human resource management, analysing how it influences personal motivation, career expectations and return on investment in training, and identify measures that can minimise any negative effects on the organization.

As for **recommendations and other practical considerations**, the differences between the AAFF branches and the specific nature of the capabilities that have been or will be built (in terms of missions, type of means employed or nature of the operational environment) may require different weighting factors and occasional adjustments to the structure of the PMOs. The management processes that have already been developed can be standardised to the National Defence agencies involved or adapted to the specific needs of the branches, thus maintaining the focus on the essential goal, which is to standardise all components of the PM methodology. The benefits of this management model will only be fully achieved if this philosophy is broadly disseminated and adopted by all national defence stakeholders through consolidated change management and continuous improvement.

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