

Design of Management Accounting Systems in Public Administration: a Case Study

Armindo Frias. CINA V, Escola Naval, Instituto Universitário Militar, Almada, Portugal; Advance/CSG, ISEG-Universidade de Lisboa, Lisboa, Portugal. armindo.frias@gmail.com.

Catarina Lourenço, CINA V, Escola Naval, Instituto Universitário Militar, Almada, Portugal.

Ana Conceição. University Institute of Lisbon, Portugal. ana_cristina_conceicao@iscte-iul.pt

Abstract

Purpose: This work aims to design a management accounting system (MAC) framework for a public sector organization. Many public entities experience difficulties in designing and implementing MACs. Our proposal intends to be as a useful tool in the accomplishment of this task.

Methodology: A comprehensive case study of the organizational structure and operational activity was performed, following an interventionist research with the aim of designing a cost accounting system for a public sector organization.

Results: A framework for implementing a management accounting system in the public sector is proposed.

Originality: The literature highlights the difficulty and failure in the implementation of management accounting systems in the public sector organizations. This research intends to contribute to this discussion, presenting a roadmap for the MAC's implementation process, highlighting possible obstacles that may arise.

Keywords: Costing system; Homogeneous cost pool method; Management accounting; Public administration; Framework.

1. Introduction

Western societies face the challenge of organising public services efficiently and in a way that meets the needs and principles required by their citizens. The

existence of a dual organisational objective, the provision of high-quality public services and the need to manage its resources efficiently, creates increased challenges in terms of management and accountability (Cetindamar, 2018). Due to its budget and social relevance, special attention has been paid to the effectiveness and efficiency of the health area, especially in a context marked by COVID-19 (Liu et al., 2022).

In order to assess the performance of public services, we need to be able to measure and record its activities (Pache & Santos, 2013). Management accounting systems assess the results of public policy activities and projects, contributing to decision-making in order to achieve the objectives in terms of services to be provided to citizens. Organizations that provide health services are professional bureaucratic organizations (Battilana & Lee, 2014). As such they combine elements of professionalism and bureaucratism in a hybrid form. By their nature, hybrids organizations are “arenas of contradiction” (Christensen & Lægheid, 2008, p. 97), combining multiple organizations forms (Kurunmäki & Miller, 2011). The implementation of performance measurement systems is particularly challenging in hybrid organizations, because it is difficult to reach a common agreement on the establishment of those measures (Ryan et al., 2002). On the other side, accounting has been argued as having a mediating role residing at the intersection of a variety of discursive and professional expectations (Suomala et al., 2014).

This paper is about an experimental case study that follows an interventionist research (cf. Drury & Tayles, 2021; Bhimani et al., 2019) with the aim of designing a cost accounting system for a public sector organization. The case we focus on is an organization responsible for providing healthcare, the Naval Medical Centre (NMC) of the Portuguese Navy (henceforth ‘Navy’). Our choice for this organization was due to its complexity, combining the health and public sectors. The management accounting system designed was based on the ‘homogeneous costs pool method’ (Drury & Tayles, 2021; Franco et al., 2015), in order to determine the costs of the services provided by the NMC. This method is the most recommended when the choice falls on traditional cost accounting methods, resulting from the extension of the proportion that the indirect costs based on volume represent in relation to the total indirect costs and the level of diversity of

the products/services provided (ibid). Therefore, our goal is to present a design on how to implement a management accounting system in a public sector organization, more specifically, we aim to answer the main research question: *how to design a management accounting system based on a departmental method in a public organization?*

The paper is structured as follows. Literature review on homogeneous costs pool method is presented in Section 2. Section 3 describes the methodology adopted. In Section 4, the empirical study is developed. The paper ends with the presentation conclusions in Section 5.

2. Literature Review

Information is the basis for decision-making, being management accounting a powerful tool to know the internal functioning of the organization (Estrin, 1990). The interests of the academy on management accounting and accountability aren't new or specific to specialized journals and, has increased in recent years (Grossi et al., 2020). On the practitioners' side, the accounting procedures implemented are generally in accordance with the authorities' recommendations and are adopted because they are mandatory. Exceptions are mostly in the public sector, due to the need to improve its efficiency or to increase transparency and the flow of information towards citizens, authorities or other interested parties (Carty, 1982; Jackson & Lapsley, 2003). The need for public administration to measure efficiency, effectiveness and economy in the use of resources encourages the practice of new operational methods, in which management accounting plays an essential role (Pinto et al., 2013; Tran & Nguyen, 2020).

The public sector needs to adopt an accounting system adapted to its reality and management requirements (Rua & Carvalho, 2006), recording financial accounts, fulfilling legal obligations and demonstrating its legitimacy through ethical performance and compliance with the accountability principles. The dissemination of IPSAS, based on the accrual basis, allowed a better interpretation of financial information and liabilities, reinforcing the principle of accountability (Aggestam-Pontoppidan & Andernack, 2016). The principles and

methodologies of the New Public Management approach also contributed to modernize the management of public administration and its accounting systems (Hood, 1991). However, several difficulties remained in accounting and reporting practices in public entities, namely: (1) the difficulty in comparing financial information with other countries; (2) inconsistency and technical fragmentation between the private and public sectors; (3) the need to apply the accrual regime basis; (4) the absence of consolidated financial and budget statements; (5) the orientation of the accounting system towards the control of public expenditure, which proved to be incapable of providing complete, reliable, relevant and timely information; and, (6) the less importance given to the accounting functions, as there is no single entity responsible for accounting all transactions or relevant events of state organizations.

The implementation of management accounting systems is a complex and time-consuming task that faces many controversies and difficulties. Despite all the constraints, its application is essential, due to the benefits that result from the transparency and the accuracy of account information, which, in turn, provides adequate public funding and better decision-making (cf. Silva et al., 2020). The implementation process is not equal in every entity or country. Different stages and factors like economic development or cultural features can make a difference (Amirkhani et al., 2020; Villarmois & Levant, 2011). Not all management accounting methodologies are equally suitable, or provide the same level of performance. Each entity should adopt those that best suit its reality and objectives (Pierce & Brown, 2006).

Management accounting systems can lower operating costs and improve efficiency, including in not-for-profit hospitals (Lawrence & Parry, 1994). More contemporary accounting practices tend to give better chances to enhance the entity's performance (Nuhu et al., 2016). The information produced by management accounting is essential for managers to monitor operations and improve decision-making. Different costing systems, such as the total, variable, direct, rational or standard costing system, can be adopted. According to Franco et al. (2015), the choice of the costing system should reasonably reflect the operating conditions existing in the entity. To allocate indirect costs, common to two or more cost objects, it is necessary to use allocation criteria (Bhimani et al.,

2019; Drury & Tayles, 2021). To ensure greater reliability and accuracy in the information produced, multiple criteria can be used.

There are different methods of allocating indirect costs, according to the desired degree of precision. Among these various methods, there is the traditional departmental method – a two-stage allocation process, such as the Homogeneous Cost pool Method (HSM), or the more sophisticated Activity-Based Costing (ABC) method. The HSM is based on the division of the entity into organizational segments, called sections or cost centres, for which operating costs are determined and, in turn, allocated to cost objects (Bhimani et al., 2019; Drury & Tayles, 2021). Indirect costs have been growing exponentially, being the main component in the cost structure of most organizations. This rise is not due to the increase in production and sales volume, but fundamentally to the greater complexity of operations. Traditional allocation bases do not explain the behavior of most indirect costs and, consequently, their use can lead to incorrect allocation of indirect costs by products or services (Drury & Tayles, 2021; Garrison et al., 2018). The difficulties evidenced in the use of traditional methods, such as the HSM, are minimized through the use of more sophisticated methods such as the ABC (Cooper, 1990; Cooper & Kaplan, 1992, 1987). The purpose of the ABC method is to allocate indirect costs more accurately. In ABC, the causes of consumption of overhead resources are activities. Costs are therefore accumulated in homogeneous groups of costs and activities (Activity Cost Pools) of an entity. Subsequently, these costs are allocated to products or services through drivers or cost drivers (Activity Cost Drivers) (Drury & Tayles, 2021; Garrison et al., 2018). The ABC method assumes that produced products consume activities and activities consume resources (Lanen et al., 2020). This allows greater homogeneity of pooled costs compared to the traditional costing system (Gosselin, 2007; Jones & Dugdale, 2002). ABC is not, however, exempt from criticism. Comparing to traditional full costing, ABC is argued to be more difficult, complex and costly, also causing workers resistance (Major & Hopper, 2005). Different factors may enable or hinder the decision to implement one of the methods (Nassar et al., 2013). Therefore, for each case, the advantages and disadvantages of each method should be carefully weighted.

3. Methodology

An experimental case study (Yin, 2018) was carried out from September 2019 to September 2020. This study followed a qualitative research strategy, according to the research steps outlined by Ryan et al. (2002). As our research methodology, an interventionist research was followed (Baard & Dumay, 2018; Dumay & Baard, 2017). One of the researchers acted as a consultant of the organization, aiming at providing guidance for solving problems and producing both theoretical and practical outcomes (Baard & Dumay, 2018).

Our research question: *how to design a management accounting system based on a departmental method in a public organization?* led us to analyse the budgetary structure that supports the entity under study, as well as its organization and internal cost structure. Detailed knowledge of the existing reality, from the macro to the micro level, proved to be essential to select the most appropriate costing system and cost allocation criteria for this specific case.

Data were gathered from multiple sources, including semi-structured interviews, internal organization documentation, and government and regulators reports and legislation. Interviews were conducted covering the entity's financial and operational structure, at the macro level, and the tasks and processes performed at the micro level. Furthermore, direct observation and several informal contacts were made by e-mail or phone. Informal contacts were particularly useful for data triangulation (Yin, 2018), verifying or supplementing evidence collected during formal interviews.

The options made throughout the work and the proposed framework were discussed and validated with the professionals from the different areas, to ensure its effective connection between theory and practice.

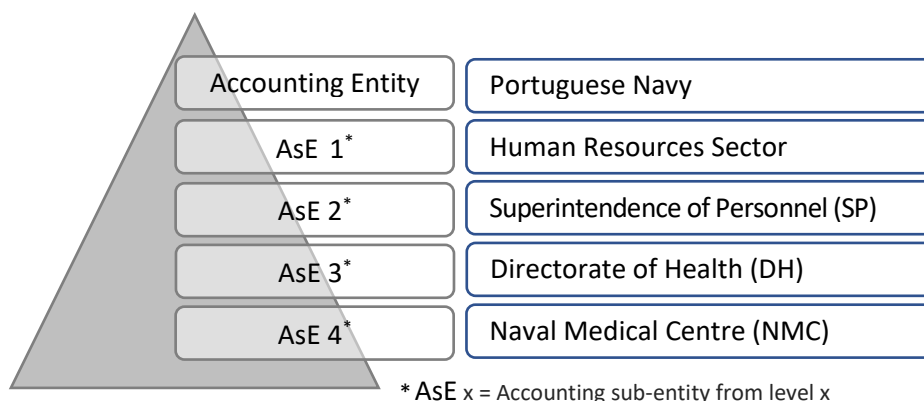
4. Case Study

4.1. Setting the scene

Portuguese public entities when implementing a new accounting system have been facing obstacles such as: (1) doubts as to the scope of accounting standards; (2) delays in adapting accounting systems at the information technology level; (3) lack of meeting the conditions to certify the accounting systems; (4) deficit in communication strategy with leaders and policy makers in the change process; (5) lack of qualified human resources, recruitment and training difficulties (Tribunal de Contas, 2019).

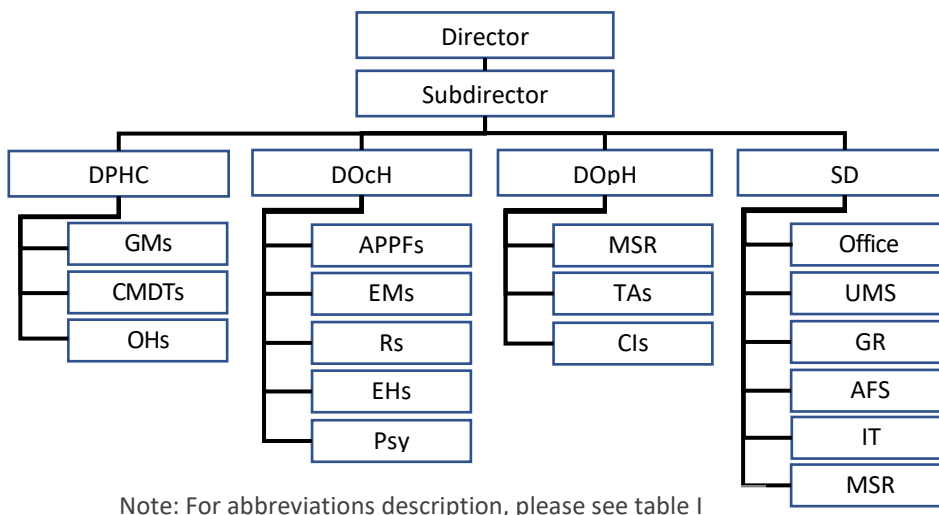
The Portuguese Navy is part of the central administration of the state with administrative autonomy, constituting itself as a separate accounting entity. Internally, the financial and asset management is based on a hierarchical structure of Accounting sub-entities (AsE) where the first level, strategic, has a strong adherence to the functional areas of the institution and, the lower level, has no budgetary expression and with a very restrict financial autonomy. The human resources sector, headed by the Superintendence of Personnel (SP), is an AsE. It includes several bodies, such as the Directorate of Health (DH). The NMC is an operational centre of DH, depending on it regarding the administrative, budgetary, financial and logistical aspects. Figure 1 shows the application of the Navy's financial and asset management structure to the specific case of the NMC.

Figure 1 – Navy's financial and asset management structure



NMC is an organic unit of the Navy with patrimonial relevance and no budgetary expression. Its mission is to provide primary healthcare in the field of operational and care medicine, as well as the coordination and control of health and medical-sanitary activity, carried out in the domain of health inspection, outpatient care and support to operational activity, in order to ensure the readiness of the Navy's human resources. Its organic structure includes four departments, namely: Department of Operational Health (DOpH); Department of Primary Health Care (DPHC); Department of Occupational Health (DOcH); and, Support Department (SD). Each department has several subunits. Figure 2 presents the organic structure of the NMC.

Figure 2 - Hierarchical structure of the NMC



4.2. The design of the management accounting system

The NMC's administrative and financial services are supported by workers belonging to the human resources sector. Thus, the costs to be considered in its management accounting system came from other financial centres of the Navy, namely SP and DH. Considering the services provided by the different Units that make up the NMC departments, the following services were identified: consultations; medical-sanitary conditions; nursing care; operational activity; psychology activity; water analysis (water produced on ships); medical evacuation; auxiliary diagnostic and therapeutic tests; health medical inspection; and, physiotherapy session. As for the criteria and costing methods to be adopted, the implementation manual of public administration accounting

standards considers that the Total Costing System is the most appropriate for public administration. As the NMC is a public administration entity, this system was chosen. In dealing with expenses from SP and DH, upstream support entities, the Rational Costing System was used, in accordance with the model implemented in the Navy's human resources sector.

The costing method to be selected must adjust to the characteristics of the entity under study. The NMC is a military entity with a hierarchical structure, where the assignment of responsibility is well defined. Since its functional activity is based on the organic structure, the costing method that best adapts to this functional organization, making the calculation of costs associated with the different services provided more realistic, is the HSM. This method is the most recommended when the choice falls on traditional cost accounting methods, resulting from the extension of the proportion that the indirect costs based on volume represent in relation to the total indirect costs and the level of diversity of the products/services provided (Drury & Tayles, 2021; Franco et al., 2015). Thus, the determination of the cost centres respects the entity's organic structure, as shown in table I.

Table I - NMC's Operational and Auxiliary Cost centres

Operational cost centres	Auxiliary cost centres
<ul style="list-style-type: none"> • GMs - General Medicine subunit • CMDTs - Complementary Means of Diagnosis and Therapeutics subunit • OHs - Oral Health subunit • APPFs - Assessment of Physical and Psychic Fitness subunit • EMs - Exercise Medicine subunit • Rs - Rehabilitation subunit • EHs - Environmental Health subunit • Psy - Psychology subunit • MSRs - Medico-Sanitary Readiness subunit • TAs - Training and Assessment subunit • CIs - Crisis Intervention subunit • NMC-head - NMC Board head 	<ul style="list-style-type: none"> • Office - Central Office • UMS - User Management service • GR - General Reception • AFS - Administrative and Financial Support section • IT - IT Section • MRS - Material Resources Section • DPHC-head - Department of Primary Health Care • DOcH-head - Department of Occupational Health • DOpH-head - Department of Operational Health • SD-head - Support Department

The tasks developed in the auxiliary cost centres, between services, and in the operational cost centres, final services, are listed in table II. The cost calculation related to the services provided, complied with the HSM, without considering the

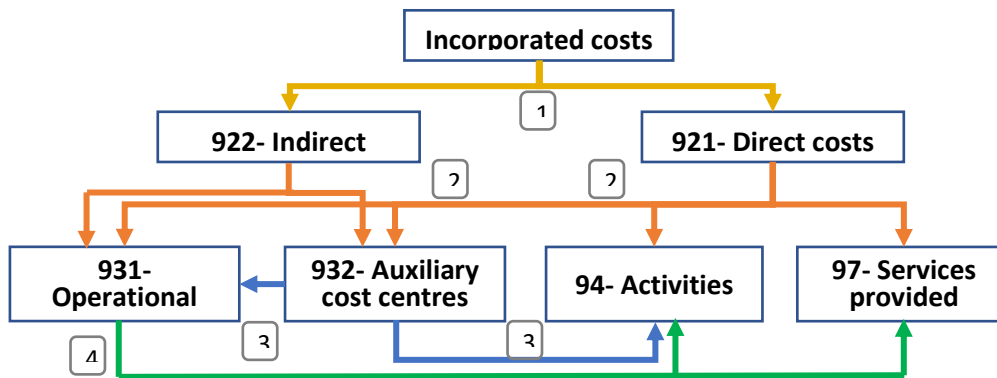
activities for its calculation, allowing a more accurate measurement for the entity under study.

Table II: Identification of intermediate and final activities

Cost centre	Activities
Office	Performing the tasks related to the management of human resources
Office	Managing correspondence – mail services
Office	Organizing messages
UMS	Supporting health technicians in administrative procedures
UMS	Organizing clinical documentation
UMS	Processing statistical data
UMS	Preparing records to the Naval Health Board
GR	Managing phone contacts
GR	Registering users' requests
GR	Supporting users
AFS	Proposing the acquisition of goods and services
AFS	Receiving the material
AFS	Replacing consumable goods
AFS	Supporting management and maintenance of facilities and equipment
IT	Proposing the acquisition of IT goods and services
IT	Maintaining equipment and software
IT	Ensuring the protection of programs and databases
MSR	Repair facilities and equipment
MSR	Managing NMC's car fleet
MSR	Supporting the maintenance of electromedical equipment
DPHC/DOcH/DOpH/SD head	Supervising and coordinating
GMs, SSO, APPFs, EMs, Rs e Psy	Providing appointments
MSR, GMs e APPFs	Ensuring nursing care
GMs	Performing evacuations
CMDTs	Performing complementary diagnostic and therapeutic exams
Rs	Carrying out rehabilitation treatments
AFS	Inspecting physical fitness
Psy e CIs	Carrying out preventive and mental health promotion actions
EHs	Monitoring and controlling the water quality for human consumption
MSR	Preparing medical-sanitary conditions
TAs	Supporting healthcare training and assessment

For the development of a management accounting model adjusted to NMC, respecting the accounting standards principles, it was considered appropriate to subdivide the task of allocating expenses into four stages, as shown in Figure 3.

Figure 3 – Management accounting system implementation



To implement the management accounting system, a four-stage methodology is proposed. The different stages contribute to the expense's calculation, allocating costs to the activities and services. The procedures and allocation criteria related to each stage are as follows:

In the first stage, the costs to be incorporated were identified (salaries, acquisition of goods and services, disposable medical material, medicines, equipment depreciation and SP and DH expenses).

In the second phase, direct costs are allocated (e.g. salaries; acquisition of goods and services; medicines and disposable medical material). As for indirect costs, these are allocated to user cost centres (operating and auxiliary), through different allocation criteria. Accounting standards suggest that multiple allocation criteria should be used for this imputation. Thus, to allocate these costs, for each of the expense groups, the allocation criteria chosen was the one that best explains the behavior of these costs. For example, costs related to office supplies, cafeteria, water, laundry services, communications and administrative expenses of SP and DH, the number of employees was considered as the allocation criteria. For the acquisition of equipment, cleaning and hygiene, electricity and depreciation of equipment, the occupied area was considered. Regarding the depreciation of tangible fixed assets, it was not possible to obtain values related to the depreciation of the building, so they were ignored.

In the third stage, the costs corresponding to the auxiliary cost centres are transferred to the operational cost centres, using different allocation criteria. For the Office, AFS and IT, the number of employees was considered as all individuals who carry out their activity in the Operational cost centres are relatively proportional users of the activities carried out by these auxiliary cost centres. Regarding the UMS and GR, the number of clinical actions was considered - these auxiliary cost centres develop tasks to support clinical actions provided to users by the different operating cost centres, except for the management board. For the case of the MSR, occupied area was designed. There is a direct relation between the physical area occupied by the cost centres and the existence of equipment; this relation remains with regard to the maintenance needs of the equipment. As for the DPHC, DOcH and DSOP-head, the number of subunits was considered as there were no significant differences in relevance between the subunits of each division. SD-head costs were allocated equally. This division performs supervision and coordination tasks for the auxiliary cost centres (Office, UMS, GR, AFS, IT and MSR) which, in turn, exist to support the work developed by the operational cost centres, except for the NMC-head. Its action is transversal and uniform for all sectors of the entity.

In order to provide information on the costs of the intermediate activities, the cost of the auxiliary cost centres are transferred to the respective activities, using the allocation criteria. The criteria of the percentage of hours spent by each activity was considered the most suitable for all cost centres.

In the fourth stage, the total cost of the operational cost centres is transferred to services and to the final activities, with the respective allocation criteria. For the GMs, APPFs, RS, Psy and MSR, the number of employees per service was considered, as it is possible to allocate employees for each type of service performed. For the remaining cost centres, the number of clinical actions was chosen, since there is homogeneity in the services provided. The costs of services are then obtained, resulting from the sum of direct expenses and the costs of operating cost centres. The costs of the final activities result from the sum of their direct expenses and the costs of the operational cost centres to which they contribute. Thus, to allocate the costs of the operational cost centres to the final activities, the same allocation criteria applied to the services were used.

4.3. The implementation roadmap

A framework for implementing a management accounting system in a public organization was developed. According to the specificity of each organization, it is necessary to define the costing method and the cost allocation system that best fits to the context and internal characteristics of the organization. It is also essential to carry out interviews to identify costs and how they relate to each other, to understand the implemented organisational and financial structure, existing work processes, available information and services provided at the various levels of management.

The presented method comprehends four stages: (1) the first, identifying the expenses to be incorporated into the defined costing method; (2) the second, assign the value of direct and indirect expenses to the cost centres and activities; (3) the third, transferring the costs corresponding to the auxiliary cost centres to the operational cost centres and activities; and, (4) the fourth, allocate the total amount of the operational cost centres to the final services and activities. With the exception of the first, for the fulfilment of the remaining three stages, it is necessary to define criteria for the allocation of the various expenses to be considered, which have a direct relationship with the organization and the way in which the entity operates.

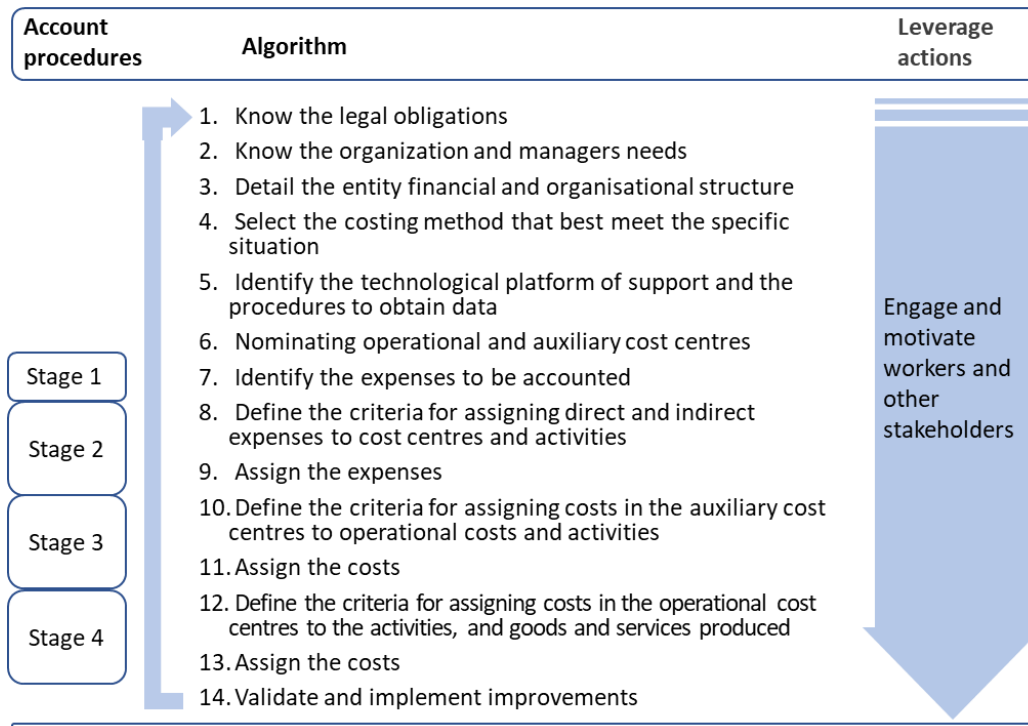
The implementation of management accounting systems, namely in public organizations, faces several challenges. There is insufficient technical preparation of human resources in management accounting area, which increases their resistance as there is difficulty in perceiving the potential advantages arising from the implementation of a management accounting system (Liem, 2021). As Jackson and Lapsley (2003) argue, the implementation of accounting systems must have the involvement of non-financial managers. Most of the time, accounting is considered as an increase of work not followed by an improvement of the organization activity. This is the case of NMC as it is in most healthcare organizations, where cost information depends also on healthcare professionals.

Identifying the internal cost structure and choosing criteria for allocating indirect costs requires detailed knowledge of the organization and its different activities. In specific situations, the demands imposed by management accounting involves changing the organization's structure and its activities. This can represent an opportunity to improve existing processes, but it can also be seen as a factor of instability. The mapping of activities is a very time-consuming process and requires a cross-sectional view of the different existing services. It is only possible with joint work and collaboration between the different areas of activity within the organization. The level of difficulty of this process is related to the size of the organization and the complexity of their activities. All this process of gathering information from the operational level (micro) to the strategic level (macro), requires the existence of information technology systems aligned with the accounting requirements.

Finally, highly institutionalized organizations, such as the public and military organizations, pose an additional challenge for the implementation of management accounting systems and management accounting change, therefore requiring the involvement in the project at different levels, from top managers to technical professionals.

In order to implement a MAC, in addition to the four stages preconized by the accounting literature (Drury & Tayles, 2021; Franco et al., 2015) and mentioned above, the difficulties experienced in our empirical site drove us to the need to carry out some preparatory work and the effective involvement of all managers and technical professionals. Figure 4 outlines this planning work, constituting our proposal for a MAC implementation framework.

Figure 4 – MAC implementation framework



5. Conclusion

The management accounting system generates information to support the decision-making process of managers of public organizations, to improve the organization's performance, its accountability and transparency.

For a successful implementation of a MAC, it is necessary to have in-depth information of all processes and activities performed, making it possible to identify the cost centre structure and the allocation method. A list of perceived difficulties for the implementation of a MAC is presented.

Contributing to the effective implementation of management accounting in a public organization, a framework is proposed (figure 4). Its effective implementation and the analysis of its results, enhance the efficiency and effectiveness of the different cost centres and the organization, encouraging the introduction of continuous improvement processes. Despite the option for a departmental method, the Homogeneous Cost pool Method, the identification of

the activities (based on the activity-based costing method) and the calculation of their costs are an asset, allowing a critical analysis of the activities performed.

The limitations of the present study are linked to the breadth and complexity of the functions inherent to the mission of the NMC, with a significant weight of indirect costs. The subjectivity inherent in the choice of allocation criteria and the analysis of the collected data, since part of them derives from our empirical understanding of the phenomena, can bias the value of the costs to be obtained.

For future studies, we propose the validation of the proposed framework, replicating the implementation of the presented model in other public organizations from different sectors, after the necessary adjustments to each organizations' reality.

Acknowledgments: The authors would like to thank to the management head and to all workers from Centro de Medicina Naval, from Portuguese Navy, for the collaboration and knowledge sharing.

Funding statement: This work was supported by Navy Research Center (CINAV) and FCT, the Portuguese national funding agency for science, research and technology, Portugal. Project UID/04521/2021.

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