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Thayane De Souza Amaral;Armando Araujo De Souza Junior;Rosely Costa Da Silva

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Abstract

The calculation of costs in the public sector translates into a way of assessing management efficiency. However, there are great difficulties encountered in implementing this system. With the regulation of the Price Registration System - SRP, there is now the possibility for an agency to buy or contract for its own use and allow other agencies to participate (or ask for a ride) in the same bidding instrument, as long as it is of interest. homogeneous. This article presents a study that measured the cost of purchasing inputs at a university hospital in the city of Manaus by adhering to price registration procedures using the ABC cost. A case study was carried out and the data were collected through documentary research, mapping the acquisition process and unstructured interviews. Subsequently, the ABC costing method was used to measure the cost of the service performed (object of the study) for the acquisition of these inputs. The results of the study indicate that the ABC costing method is the most adequate to measure the costs of services performed in the public sector, since it avoids the arbitrary nature of the apportionment, allocating the values referring to the human and material resources applied in the acquisition process.

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Abstract

The calculation of costs in the public sector translates into a way of assessing management efficiency. However, there are great difficulties encountered in implementing this system. With the regulation of the Price Registration System - SRP, there is now the possibility for an agency to buy or contract for its own use and allow other agencies to participate (or ask for a ride) in the same bidding instrument, as long as it is of interest. homogeneous. This article presents a study that measured the cost of purchasing inputs at a university hospital in the city of Manaus by adhering to price registration procedures using the ABC cost. A case study was carried out and the data were collected through documentary research, mapping the acquisition process and unstructured interviews. Subsequently, the ABC costing method was used to measure the cost of the service performed (object of the study) for the acquisition of these inputs. The results of the study indicate that the ABC costing method is the most adequate to measure the costs of services performed in the public sector, since it avoids the arbitrary nature of the apportionment, allocating

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Keywords: Cost Systems; Adhesion, ABC - Activity-Based Costing, Public Sector.

1. Introduction

With the growth of the scale of industrial activity that occurred from the 18th century onwards with the Industrial Revolution, the evaluation of products became more complex, the production costs were shared with more than one product and the concepts of General Accounting were no longer sufficient to determine the value of finished products and business results (Carioca, 2012), in addition to the need to obtain more inventory control, changing the preparation of financial statements. From these challenges, the first specialized cost accounting tests emerged (Crepaldi & Crepaldi, 2017; Souza & Silva, 2019).

Among the functions of Cost Accounting, three main ones can be highlighted: Planning, Control and Management for Decision Making (Hansen & Mowen, 2013), which made him leave his role of only assisting in the assessment of stocks and global profits, passing to be a tool for management decision control (Oliveira, Carvalho & Correa, 2010), being increasingly used in non-industrial companies and institutions, such as banks, finance, commerce, consultancy and the public sector (Bertó & Beulke, 2013; Martins, 2018).

In this context, the Public Sector seeks to control and determine its expenses and results in order to optimize decision-making and management processes. In addition to the management issue, the use of cost information in the public sector is configured as a mandatory requirement in the legislation (Costa, et al., 2018), an obligation imposed since the 1960s with the advent of Federal Law No. 4,320, of March 17, 1964. Considering that the Administration is also obliged to observe a series of procedures and to act in accordance with the law for the purchase or contracting of services (Bittencourt, 2015; Barbosa, 2012), the bidding presents itself as an indispensable and prior administrative procedure, aiming to guarantee the same conditions to all those interested in formalizing a contract with a public entity (Palaveri, 2005; Law nº 8.666/93), being governed, above all, by the administrative principles that guide public management acts (Borges & Bernardes, 2014).

In this perspective, this work aims to measure the cost of services performed for the purchase of inputs at a university hospital in the city of Manaus, by adhering to the minutes of price registration using the methodology of calculating ABC - Activity Based Costing.

2. Theoretical Foundation

2.1 Cost Accounting

Cost accounting is a branch of accounting that was initially used by the sector that needed assistance to determine the value of products (Martins, 2018). Over time, Cost Accounting started to perform other functions, highlighting three main ones: planning, control and management for decision making, ceasing to be a simple verification aid for an important organizational management tool (Hansen & Mowen, 2013).

2.1.1 General Principles and Concepts of Costs

Costs cannot be confused with expenses, which is what usually occurs, because expenses are directly linked to administrative expenses and costs to the production of goods and / or services (Martins, 2018; Osni, 2018).

In addition to differentiating costs from other expenditures, costs must also be observed and classified according to the identifications with the production of goods and services, attributing to the separation of Direct Costs, Indirect Costs, they can also, from the volume of production be classified between Fixed Costs and Variable Costs (Bertó & Beulke, 2013). Figure 1 summarizes the concepts of costs.

<p>Spending</p> <ul style="list-style-type: none"> •All occurrences of payments or receipts of assets, costs or expenses is a general term of expenditure (PADOVEZE, 2011).
<p>Investments</p> <ul style="list-style-type: none"> •They are expenses incurred on assets or expenses and costs that will be fixed, that is, expenses incurred according to their useful life or future benefits (CARIOCA, 2012).
<p>Costs</p> <ul style="list-style-type: none"> •They cannot be confused with investments or expenses, as they are expenses related to products directly or indirectly (BERTÓ and BEULKE, 2013).
<p>Expenses</p> <ul style="list-style-type: none"> •These are the expenses related to the administrative and commercial area, it can be said that they are the expenses necessary to sell and send products (KOLIVER, 2010; GOUVEIA, 2001).
<p>Payments</p> <ul style="list-style-type: none"> •It is the financial execution of the company's expenses and investments (MARTINS E ROCHA, 2015).
<p>Losses</p> <ul style="list-style-type: none"> •Facts that occurred in exceptional situations that are outside the normality of the company's operations, considered non-operational, are not part of the production costs (OSNI, 2018).
<p>Losses</p> <ul style="list-style-type: none"> •It results from the calculation of the result of a period, when expenses exceed revenues (MEGLIORINI, 2012).

Figure 1: Terminologies used in Costs

2.1.2 General Principles and Concepts of Costs

Martins (2018) states that a system is not just a set of flows, routines, norms, but is also composed of people, and that depends on them for it to work and achieve the goal of its creation / application.

The first step before starting the implementation of costs in an organization is the definition of the Costing System that will be used, as it interferes in the results (Dias & Padoveze, 2007). Bonacim & Araujo (2010) argue that even though there are some alternatives of using costing methods, it is possible to adopt more than one method simultaneously and harmoniously, aiming to subsidize the cost systems, since it has common characteristics, having specific information to the functions of control and planning of the activities of an entity. A demonstration with the characteristics of the main Costing Systems or Methods will be shown below in Figure 2.

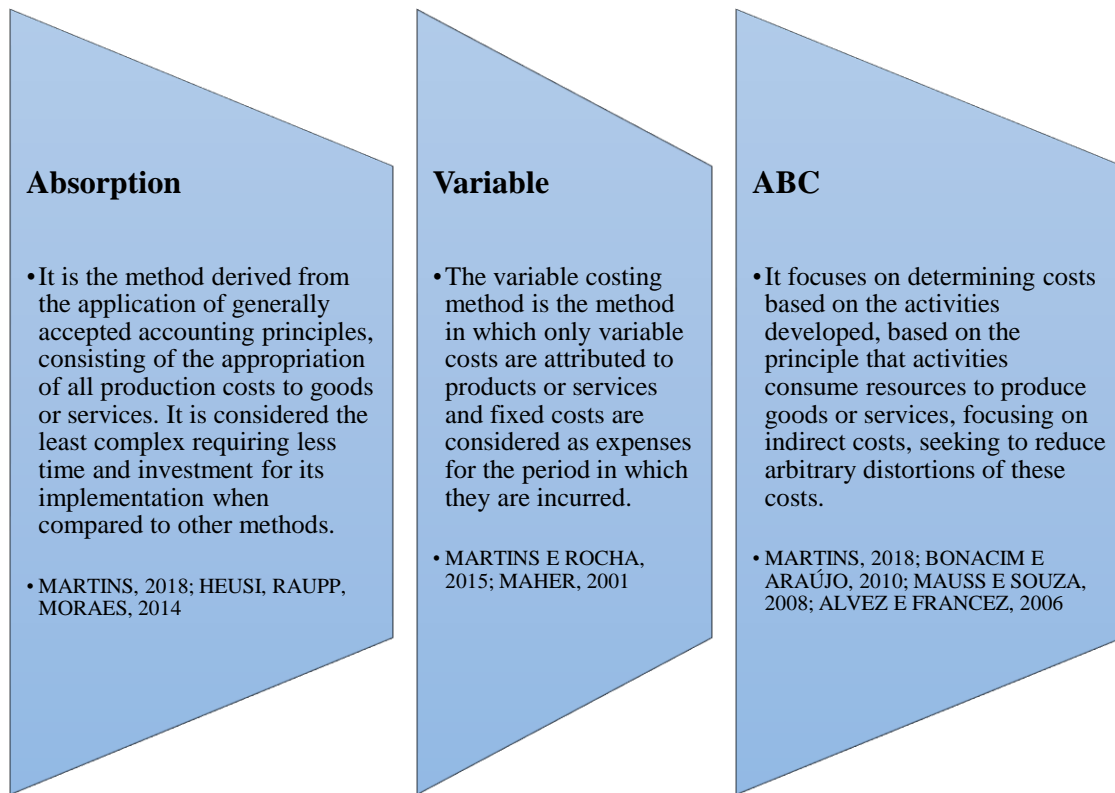


Figure 2 - Main Costing Systems or Methods

2.1.2 Activity Based Costing

Developed from the dissatisfaction of cost data determined by traditional methods (Brimson, 1996), methods that were developed in another time, where labor and applied materials were predominant factors of production and indirect costs did not contribute significantly to the cost total (Kaplan & Cooper, 2000), ABC Costing was developed to systematically distribute these costs (Silvestre, 2002; Bornia, 2010; Megliorini, 2012).

Corroborating with the authors above, Alves & Francez (2006) and Martins (2018), state that ABC is the method that seeks to reduce distortions caused by arbitrary allocation of indirect costs, and can also be applied to direct costs. In this sense, the activity-based costing method focuses on indirect costs, making the cost composition more robust, allowing a more accurate calculation of the economic result (Mauss & Souza, 2008). Figure 3 illustrates how to allocate costs to products through ABC.

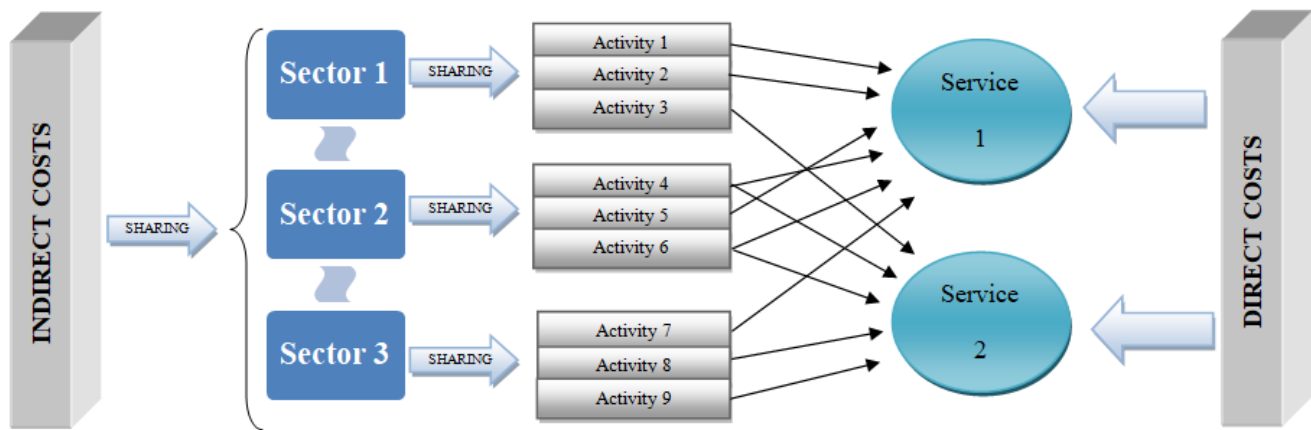


Figure 3 - ABC Costing Scheme - Activity Based Costing

2.2 Calculation of costs in the public sector

Because it is of great importance and for providing fundamental content to support more efficient government allocation decisions, facilitating sustainability and economic development, cost information must be disseminated throughout the public sector (Machado & Holanda, 2012). One of the main discussions regarding the implementation of cost systems in the public sector is the definition of costing objects and the method for calculating costs that become complex due to the lack of the profit factor, which makes the definition of the cost object more difficult (Tres & Silveira, 2013). As evidenced by Martins & Rosa (2014), the most viable and appropriate costing method for use “is one that produces consistent information and this should allow an analysis regarding the choice regarding the production or purchase of products and services, as well as the execution or outsourcing of certain activities”. In this sense, each unit will be able to choose the method that best meets its reality and characteristics, paying attention to the issue of consistent information and that helps in management (Costa & Raupp, 2018). In this scenario, the ABC costing method is the most discussed and suggested for the calculation of costs in the public sector (Carneiro et al. 2012; Cordeiro & Alves, 2016).

2.3 Bidding Process in the Federal Government

As established in Art. 37 of the 1988 Federal Constitution, Public Administration, unlike private individuals, is obliged to adopt a preliminary procedure when contracting the execution of works, services, purchases or disposals with third parties (Palaveri, 2005; France, 2013). As general rules, we have Law n°. 8.666/93 entitled Law of Public Bids and Administrative Contracts, as well as the Law of Trading Floor, n° 10.520 of 2002, which basically figure as the existing legislation on public tenders. Regarding the bidding modalities, five are traditionally described in Art. 22 of Law 8.666 / 93, namely: competition, price taking, invitation, tender and trading floor. The trading floor was introduced among the existing modalities, being extended to all Federative entities as of Law 10.520 / 2002 (Rodrigues, 2012). Among the procedures resulting from Law 8.666 / 93 we have the use of the Price Registration System - SRP, which consists of allowing public management to contract services or purchases without having to carry out a new bid for each contract, and from that system, the adhesion arose. Thus, unlike the bidding process, membership does not generate a contracting commitment, but a commitment to keep the quantities of products available

for the duration of the price registration (Fernandes, 2007).

3. Methodology

To achieve the proposed objective, a case study was carried out as conceptualized by Yin (2015) in a University Hospital located in the city of Manaus (AM), also using the documentary methods that according to Appolinário (2012) is part of all work of research, and unstructured interviews that are well outlined and defined by Marconi & Lakatos (2009). The survey began with the mapping of four (4) completed acquisitions. From this mapping, all the essential elements were identified for the calculation of costs, which were: identification of the sectors and their respective activities, demonstration of the resources used by these sectors; calculation of the hourly value of the server in each sector and the time of each activity; allocation and cost calculation. This path can be best demonstrated in Figure 4.

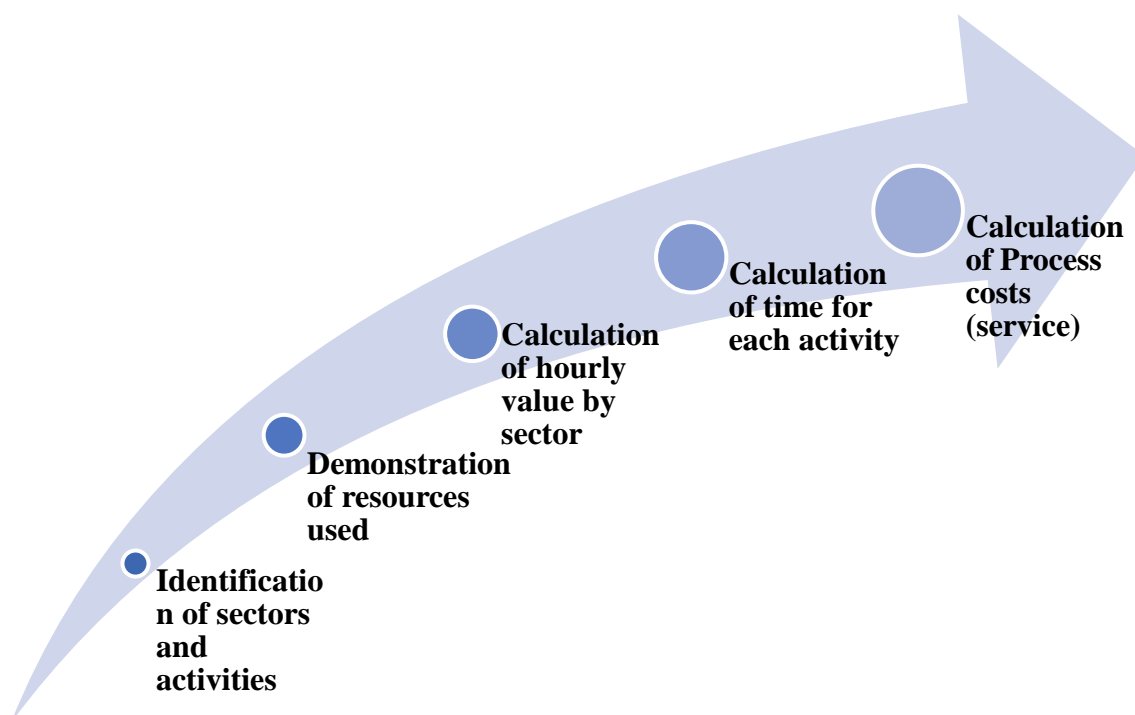


Figure 4 - Methodological Path

4. Results and Discussion

4.1 Sectors and activities involved

The identification of the sectors and activities involved was carried out through interviews and documentary research, which made it possible to elaborate the flow of the materials acquisition process carried out at the university hospital, as shown in Figure 5.

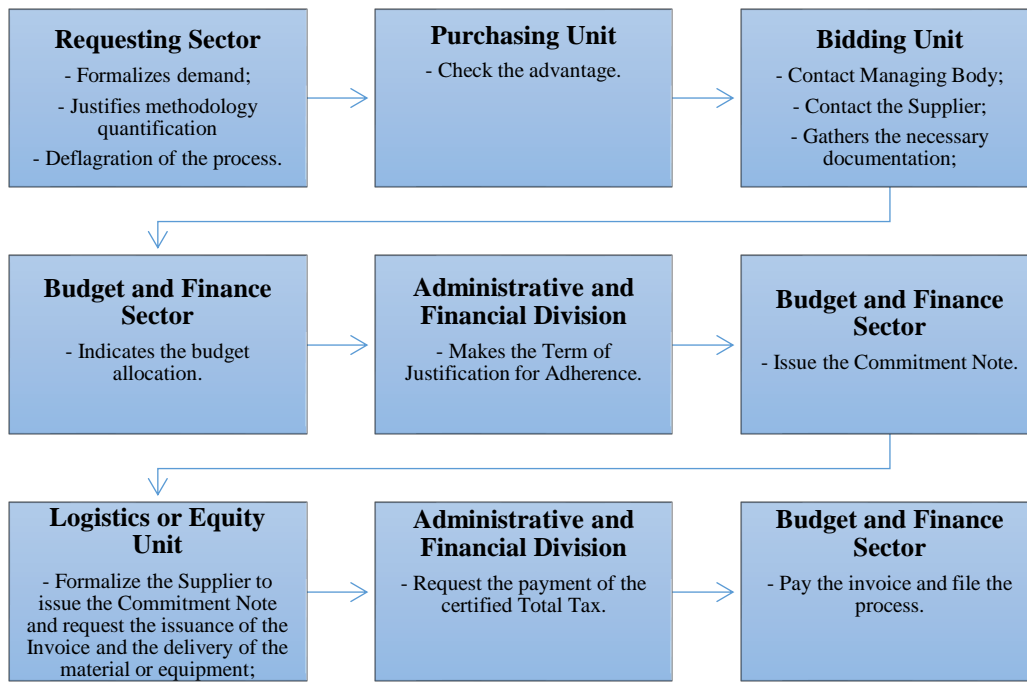


Figure 5 - Flow of the acquisition process

The acquisition process involves 6 (six) departments and, based on this information, surveys were carried out with those involved in the process to, from then on, identify the resources used and the time that each one uses for the activity.

4.2 Resources Used

Through information extracted from the Transparency Portal, it was possible to identify the remuneration and benefits (transportation, meals, etc.) of the employees involved, demonstrated in full, as shown in Table 1.

Table 1 - Monthly Compensation and Benefits by Department

Sector	Remuneration Monthly	Benefits
Bidding Unit	R\$10.751,06	R\$2.277,08
Purchasing Unit	R\$ 8.859,43	R\$ 963,81
Equity Unit	R\$ 8.326,87	R\$1.115,06
Budget and Finance Sector	R\$21.159,26	R\$1.351,93
Logistics Sector	R\$16.675,82	R\$1.096,51
Administrative and Financial Division	R\$17.900,73	R\$1.430,33

Considering that the university hospital is managed by a Public Company governed by the Consolidation of Labor Laws - CLT, social and labor charges were calculated based on the percentage shown in Table 2.

Table 2 - Percentage for calculating Social and Labor Charges

Burden Breakdown	(%)	(%)
Labor benefits		
13th salary		8,33%
Vacation		11,11%
Social charges		
INSS	20,00%	
SAT	3,00%	
Education Salary	2,50%	
INCRA/SENAI/SESI/SEBRAE	3,30%	
FGTS	8,00%	
Total Social Security		36,80%
Social Security on 13th and Vacations		7,15%
Total		63,39%

Other features that can be considered in the process are:

- A4 paper cost: they are purchased for the price of approximately R \$ 14.00 (fourteen reals) per ream, which generates a cost of R \$ 0.03 (three cents) per sheet;
- Printing cost: the entity has a contract with a supplier that costs R \$ 0.12 (twelve cents) per impression;
- Process folder: costs around R \$ 1.50 (one real and fifty cents) per unit.

4.3 Calculation of the hour and time value of activities

Consolidating the consumed resources presented in the previous steps, the monthly values were obtained, and to determine the hourly cost, the remuneration was considered divided by 176 (one hundred and seventy-six) hours, taking into account 8 (eight) hours daily in 22 (twenty-two) monthly business days per year, reaching the results of the hourly values of each department, as presented in Table 3.

Table 3 - Cost per hour with personnel

Sector	Monthly		Social and	Total Cost /Monthly	Cost/Hour
	Remuneration (Average)	Benefits	Labor Charges		
Bidding Unit	R\$10.751,06	R\$2.277,08	R\$6.815,10	R\$19.843,24	R\$112,75
Purchasing Unit	R\$8.859,43	R\$963,81	R\$5.615,99	R\$15.439,23	R\$87,72
Equity Unit	R\$8.326,87	R\$1.115,06	R\$5.278,40	R\$14.720,33	R\$83,64
Budget and Finance Sector	R\$21.159,26	R\$1.351,93	R\$13.412,85	R\$35.924,04	R\$204,11
Logistics Sector	R\$16.675,82	R\$1.096,51	R\$10.570,80	R\$28.343,13	R\$161,04
Administrative and Financial Division	R\$17.900,73	R\$1.430,33	R\$11.347,27	R\$30.678,33	R\$174,31

4.4 Calculation of activity time

Through interviews and documentary analysis, it was possible to identify the time used for each activity, which, related to the hourly value of each sector shown in Table 3, achieved the results shown in Table 4, determining at that time the cost per activity.

Table 4 - Calculation of Activity Costs

Activity	Time in hours	Executing Sector	Cost of Activity	
Deflagration of the Process for acquisition of Consumable Material	08:00	Logistics Sector	R\$	1.288,32
Deflagration of the Process for acquisition of Permanent Material	08:00	Equity Unit	R\$	669,12
Check advantage (price estimate)	16:00	Purchasing Unit	R\$	1.403,52
Contact Governing Body	02:00	Bidding Unit	R\$	225,50
Contact winning company	02:00	Bidding Unit	R\$	225,50
Obtaining documents for the adhesion event	08:00	Bidding Unit	R\$	902,00
Budget Allocation Indication	01:00	Budget and Finance Sector	R\$	204,11
Preparation of Terms of Justification for Adherence	04:00	Administrative and Financial Division	R\$	697,24
Issue of Commitment Note	00:30	Budget and Finance Sector	R\$	102,06
Contact Supplier for delivery of goods (Consumption Material)	01:00	Logistics Sector	R\$	161,04
Contact Supplier for delivery of goods (Permanent Material)	01:00	Equity Unit	R\$	83,64
Receiving the material (Material Consumption)	02:00	Logistics Sector	R\$	322,08
Receiving the material (Permanent Material)	01:30	Equity Unit	R\$	125,46
Request for Payment of the Good (Material Consumption)	01:00	Logistics Sector	R\$	161,04
Request for Payment of Goods (Permanent Material)	01:00	Equity Unit	R\$	83,64
Payment authorization	04:00	Administrative and Financial Division	R\$	697,24
Settlement of the process expense	02:00	Budget and Finance Sector	R\$	408,22
Payment of the process expense	02:00	Budget and Finance Sector	R\$	408,22
File Provisions	03:00	Budget and Finance Sector	R\$	612,33

4.5 Calculation of Process costs (Service)

After identifying the cost per activity (Table 4), it is possible to calculate the costs of services, reaching the end of the ABC costing methodology cycle, as previously illustrated in Figure 3. The application of this methodology in the present study can be demonstrated through the Figure 6.

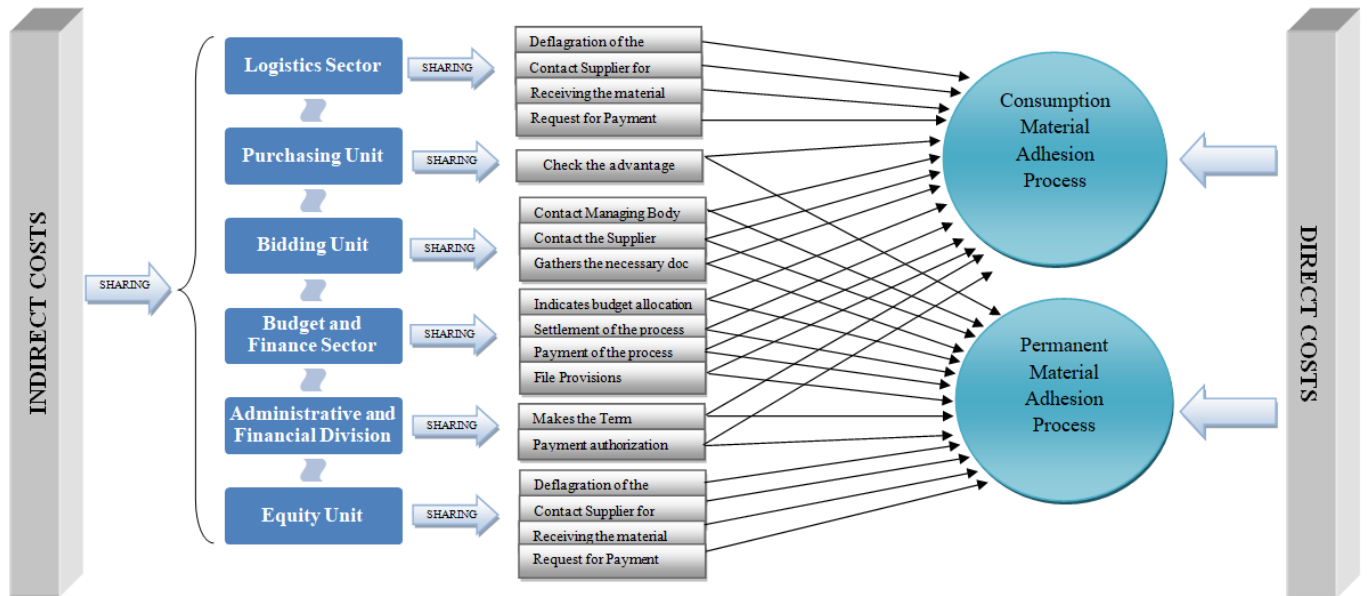


Figure 6 - ABC cost calculation process

As described in the methodology, 04 (four) material purchase processes already completed at the university hospital were analyzed. The service to complete this acquisition is the cost object of this work, which was divided into 02 (two) for the purchase of consumable material and 02 (two) for permanent material. The 02 (two) processes of consumable materials presented the costs shown in Table 5.

Table 5 - Cost of material consumption

Sector	Monthly		Social and	Total Cost /Monthly	Cost/Hour
	Remuneration (Average)	Benefits	Labor Charges		
Bidding Unit	R\$10.751,06	R\$2.277,08	R\$6.815,10	R\$19.843,24	R\$112,75
Purchasing Unit	R\$8.859,43	R\$963,81	R\$5.615,99	R\$15.439,23	R\$87,72
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The 02 (two) processes of permanent material, presented the results in Table 6.

Table 6 - Cost of Permanent Material

Object	Value Acquisition	Physical Details Other Costs	Cost with Folks	Others Costs	Total Costs	% over the value acquisition
Machine acquisition Hemodialysis	42.000,00	112 sheets/188 prints/ 01 Process Folder	R\$ 6.847,80	R\$ 57,66	R\$ 6.905,46	16,44%
Microscope Acquisition for the Ophthalmology Service	75.000,00	115 sheets/199 prints/ 01 Process Folder	R\$ 6.847,80	R\$ 59,88	R\$ 6.905,46	9,21%
Average					R\$ 6.906,57	12,83%

The data presented, verified that the total average cost of the service of acquisition of Consumable Material was R\$ 7.861,11 (seven thousand eight hundred and sixty-one reais and eleven cents), corresponding on average to 21.71% of the value of materials acquired, while the service for the acquisition of Permanent Material was R\$ 6.906,57 (six thousand nine hundred and six reais and fifty-seven cents), corresponding on average to 12.83% of the value of the acquired equipments.

5. Final Considerations

This work aimed to demonstrate the application of the ABC costing methodology to determine the costs of the procurement process carried out in the public sector. The research was carried out at a university hospital in the city of Manaus / AM.

The survey results showed the cost of purchasing consumables and permanent materials, which generated a cost to the public government of R \$ 7,861.11 and R \$ 6,906.57, respectively, representing up to approximately 21% of the acquired value.

The research makes it evident that the use of the ABC Costing method to determine service costs in the public sector was successful. ABC also proved to be the most appropriate tool for cost management in the public sector, due to the more robust treatment in the distribution of indirect costs.

From the results achieved, it is clear that bureaucracy burdens the procurement process in the public sector, as well as all other processes, which require many procedures and paths to be followed in order to comply with the rite imposed by the legislation that governs the acts of public administration.

The measurement of costs in the public sector, in addition to serving as accounting information, appears as an essential management tool for the public manager, who can use this information as indicators of efficiency and governance for example, demonstrating the managerial contribution of this research.

The economic contribution of this research is in the field of resource management, making it possible to

identify which processes are more costly, enabling the evaluation of alternatives that make services within the public sector less expensive.

As a social contribution, this work presents the disclosure of costs in the public sector, taking into account the prerogatives of transparency, making public information on the application of public resources.

For future work, it is recommended to consider the costs of electricity, water, and outsourced services, which are not considered in this work because the team involved in the service surveyed is running a home office due to the social distance experienced because of the pandemic (Covid-19).

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