

A Work Project, presented as part of the requirements for the Award of a Master Degree in
Finance from the NOVA – School of Business and Economics.

**COST ACCOUNTING ISSUES IN A MANUFACTURING FOOD
COMPANY**

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PURPOSE OF THE WORK PROJECT

Pricing activities have a central role in organizations due to the current competitive environment in the market. As such, the accuracy of costing systems and the correct assignment of costs to products are essential so that companies can be efficient in its pricing strategy. For this reason, “management accounting is seen as one of the mechanisms for the adaptation and survival of the small firm(s)” (Perren & Grant, 2000, p. 393) and costing systems that fit the needs of companies are key to success. Besides that, “managers perceive cost allocation to be important [...] to determine product pricing and product discontinuation, to evaluate performance, to promote cost awareness, and to encourage more effective resource usage” (Jermias, 2006, p. 371).

Considering the importance of this tool to companies, the purpose of this work project is to assess the evolution of traditional costing systems in a real manufacturing company, Sabalar, through a teaching case study with the final objective of “contribut(ing) to relevant knowledge” (Cooper & Morgan, 2008, p. 159) and, “while contributing to practice, [...] be valuable for theoretical work in identifying new problems to be investigated and testing theories” (Cooper & Morgan, 2008, p. 165). Also, in conjunction with the teaching case study, a discussion note is developed¹. This teaching case study can be used in masters’ courses such as Managerial Accounting or Management Control Systems when lecturing traditional costing systems.

KEYWORDS: Homogeneous Cost Pool Method; Single Overhead Rate; Cross-Subsidization; Resistance to change; Managerial Accounting.

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CASE NARRATIVE

In July 2015 Mr. Júlio Videira, Sabalar's CEO, was confronted with the important decision of whether or not to change the company's costing system. This had already been changed during the history of the company, but Mr. Videira felt that the current system was not the most appropriate one due to its lack of accuracy. With the current system, it was not possible to know the exact cost of each product, only a range for that cost. This could be harmful to Sabalar as it could lead to wrong decisions related to the pricing of products and, consequently, to considerable challenges in the long-term horizon. It had already happened to Sabalar to lose important deals due to the uncertainty about product costs. Also, Mr. Videira wanted to know if any of its products was unprofitable. This would only be possible if Sabalar used a better costing system.

As such, Mr. Videira felt the need to come up with an alternative that could optimize the current system and consequently assign manufacturing overhead costs to products with more detail, accuracy and truthfulness.

At the same time, Mr. Videira feared the difficulties in the implementation of the new system such as the resistance to change from the workers in the company, particularly in the factory, and the increase in the costs and time spent in measurement.

History of Sabalar

Sabalar is a medium enterprise that was founded in 1985 by three business associates that already had another company, Sabamar, related to the fish industry (founded in 1978). Sabalar, which means "taste of home", was founded in Benavente and it was one of the first Portuguese companies in the industry of savory. It started by producing very few products: codfish fritters, shrimp turnovers, veal turnovers and hake turnovers.

The management of both companies was done jointly by the three associates and Sabalar produced only to Sabamar, which ultimately sold the products through its distribution channel. As the production developed and new products were added, a new factory was built and Sabalar developed relations with new customers.

Some years later, one of the associates sold its shareholding to his partners and equityholding was reduced to two people. As time passed by, the other two associates decided to split the two companies between them in order to avoid management conflicts as they had similar valuations. As such, in 1998, Mr. Eurico Videira became the only equityholder of Sabalar.

In 2001, Mr. Júlio Videira, Mr. Eurico Videira's son, entered the company and became the CEO. Since then, several improvements have been done in the company's infrastructures. Nowadays, Sabalar has approximately 49 workers and Mr. Videira is supported by quality, production and commercial departments. Appendix 1 shows the current organizational chart by function. It currently produces more than 20 different products divided in two different categories: precooked products and ready meals, as it is possible to see in more detail in appendix 2. The products with more demand are codfish fritters, shrimp turnovers and beef samosas in the category of precooked products and brás codfish in the ready meals' category. Sabalar has won the award "Flavour of the year" for several of its products during the last 5 years² and it was considered a Leader SME³ by IAPMEI⁴, the Portuguese institute that supports SME and innovation.

The products manufactured at Sabalar have different production processes with different complexity levels. Besides that, some of them are more labour intensive while others involve

² Award given by Global Quality Iberia that distinguishes products with tasting quality.

³ The Leader SME (Small and Medium Enterprise) initiative aims to provide recognition, quality certification and financial and non-financial benefits to companies that have had an outstanding performance in pursuing growing strategies. This award is attributed based on financial and non-financial indicators (IAPMEI, Finresce, 2015).

⁴ IAPMEI – Instituto de Apoio às Pequenas e Médias Empresas e à Inovação.

mainly machines in its production. For example, codfish fritters constitute one of the simplest products manufactured despite its labour intensity related to the casting activity but, on the other hand, shrimp turnovers are much faster to produce as they are casted by machines. Furthermore, Sabalar has two different distribution channels: retail industry to which products are sold in packages; and, hotels, restaurants and catering companies (HORECA channel) to which products are sold in bulk.

Quality Standards

By being a food company, Sabalar needs to comply with European norms and quality standards. Along with good hygiene practices such as constant disinfection and other routines, Hazard Analysis and Critical Control Points (HACCP⁵) is one of the strategies required in the food industry, which is meant to guarantee “food safety from harvest to consumption” (U.S.Department of Health and Human Services, 2014).

Also, in its commitment with quality, Sabalar uses the method of cryogenic freezing with nitrogen which, despite being more expensive, is the safest method to preserve the abovementioned products and guarantee more quality at the end of the process.

Production of Codfish Fritters at Sabalar

Despite producing a wide range of different products in its factory and having two different production lines, Sabalar rarely produces two products simultaneously due to the decrease in demand caused by the Portuguese poor economic conditions. This has obliged Sabalar to reduce the number of employees directly assigned to manufacturing activities and, as such, there are currently only 21 employees working directly in these activities: 3 of them are cooks, 2 are

⁵ HACCP is a system with several steps, where control points are inserted along the production process. It implies that critical limits are established and then monitoring procedures are applied to verify if products are consistent with those limits. This process is constantly recorded and corrective actions are implemented if values fall outside the critical values, as it is possible to identify the source of the deviation. A critical control point might test any biological, chemical or physical factor (U.S.Department of Health and Human Services, 2014).

responsible for packing, 1 is in the metal detection tunnel and the remaining 15 in the casting activity. As such, each day normally corresponds to a run of a specific product but, if there is the need to produce more than one product in one day, the production is usually sequential and rarely simultaneous. For each product there is some preparation of raw materials in the previous day. Also, at the end of the day, there is a setup process which consists in disinfection and preparation of the workplace to the production of the next day.

The production of codfish fritters is a long process composed by many different stages, as it is possible to observe in appendix 3. The process starts with the arrival of raw materials and indirect materials at the factory. This step is performed by suppliers and, as such, Sabalar does not need to incur in any transportation costs at this stage. The raw materials needed for the codfish fritters are potato, codfish (*gadus morhua* and *gadus macrocephalus*), pasteurized egg and potato flakes whereas the indirect materials are onion, codfish cream, flavor enhancer (E-621), garlic, salt, parsley, pepper and rusk. Besides the materials that are incorporated in the final product, there are the boxes, small packages, plastic bags and the roll of the film used in the packing process, which are also classified as indirect materials.

After their arrival, the materials for package go for a special room and the materials that will be incorporated in the product are stored in the warehouse, where part of it is refrigerated. The preparation of raw materials is particularly prolonged in the case of codfish. Codfish needs to be desalted, shredded and chopped, which involves a waste of approximately 20% to 30% (the maximum waste rate registered was 38%). The other raw materials are easier to prepare as they only need to be chopped and dosed. After this, all the exact quantities are ready to be cooked in the next day.

The first step of the “production day” happens in the kitchen and it consists in preparing the several mixtures in big pans, while other operators perform the fritters’ casting. In the casting

activity, workers receive incentives based on the number of units produced in order to encourage productivity.

After the casting task, the fritters are inserted in the freezing tunnel and, in half an hour, they leave it and they are packed. The daily production, if totally dedicated to codfish fritters, is usually between 530 and 550 boxes of fritters, each one with 120 units (63,600 to 66,000 codfish fritters produced per day). The package differs according to the type of client it will be delivered to. If codfish fritters are to be delivered in a supermarket, each box has 12 small packages and each small packages includes 10 fritters, making a total of 120 fritters. If, on the contrary, the customer belongs to the HORECA channel, there are no small packages in the box as they are sold in bulk and the 120 codfish fritters are placed in a big plastic bag inside the box.

Before the storage of boxes in pallets in the warehouse of finished goods, the product is tested for the presence of metals, which constitutes one of the most important critical control points. In the warehouse, inventory of finished goods is managed through FIFO ('First In First Out'). The distribution is also done by Sabalar with its three refrigerated vans.

Current Costing System at Sabalar

The current costing system used in the company is a traditional one that consists in the use of a single overhead rate with historic costs. The basis considered in this method for the assignment of manufacturing overheads was initially the number of units produced per day but, some years ago, it changed to the number of direct labour hours per day as it was considered to be more accurate than the previous one. This is a relatively simple method that does not imply high costs of measurement but it may lead to costs of errors as the allocation rate may be arbitrary. In this system, the single overhead rate is applied in the value of overheads incurred during one day of production, which is achieved by assessing the annual value of overheads and dividing it by the number of working days in the financial year. As such, in the case that only one

product is manufactured during a specific day, there is no need to apply the single overhead rate as the total daily overhead cost will be assigned to that production run. When more than one product is manufactured in that day, the number of hours employees dedicate to each one is calculated (employees may either be divided by the two production lines as needed or dedicate part of the working day to each product) and the assignment of overheads follows that proportion.

In what concerns direct costs, which according to Drury (2015, p. 45) are the costs that can be “specifically and exclusively traced to a particular cost object”, both direct materials and direct labour need to be considered. In order to account for the total value of direct materials, the quantities of raw materials used during the production run (excluding the part of codfish wasted) are multiplied by the cost per unit and directly traced to the total number of codfish fritters produced during that day, according to the direct cost tracing method. The price per kilogram of codfish is, nevertheless, adjusted to be approximately two times the price at which it was originally bought to take into account the detailed preparation and the waste that occurs in the previous day, and the storage costs. Besides the cost of purchasing the codfish, the cost assigned to its preparation includes direct labour, manufacturing overheads (water, nitrogen and others) and it assumes that at least 20% of the codfish originally bought is totally lost as it has no other utilization. Despite being simple, the fact that codfish price per kilogram is considered to double might lead to errors as it is not known in which extent that preparation and storage has such a big influence in costs.

Considering the costs related to direct labour, the company accounts for 21 employees working directly in the production process either in the kitchen, casting, packaging or metal detection, tracing them to products at the moment of production, and also 2 employees related to cleaning activities that perform the setup process at the end of the day. Nevertheless, cleaning staff is not correctly classified. These workers operate after the conclusion of the daily production

which means that, if Sabalar produces 2 or more products in that day, the cleaning costs cannot be directly traced to a particular product. In this case, the cost of cleaning staff is common to more than one cost object and it must be allocated according to the single overhead rate. So, it is not possible to classify the labour of the cleaning activity as direct, labour it must be considered a manufacturing overhead cost. The preparation performed by employees in the previous day is not accounted in this item as it has already been considered in the cost of codfish preparation.

In what concerns manufacturing overheads, the company takes into account the value consumed per day of water, electricity, gas and nitrogen, which constitute variable costs. Nitrogen is the most significant manufacturing overhead (37% of total manufacturing overheads) in the production process as it is the input used in refrigeration chambers and tunnel. Besides this, fixed manufacturing overhead costs also need to be considered and these include the salaries of the dosage worker, production supervisor, production manager and cleaning staff. They should also include equipment maintenance, maintenance of refrigerators, rental of nitrogen deposits and tunnels, chemical analysis of products and other items. When Sabalar produces only codfish fritters during one specific day, manufacturing overhead costs are automatically assigned to the production run of codfish fritters, which corresponds to 12% of total manufacturing costs, 60% of which are variable. When there is more than one product manufactured in a specific day, the assignment of manufacturing overheads is performed using the single overhead rate as explained before.

Non-manufacturing overheads include the wages of all the employees not related to the production process such as drivers, warehouse and dispatch workers, salesmen, accountant, assistants and all the directors except the production one. Besides this, it includes all the transportation costs, insurance of the vehicles, costs of safety and hygiene at work, costs associated with the compliance of regulations, financial costs and many others associated with

the correct functioning of the company. Having all these items in mind, total annual non-manufacturing costs are equal to 341,471.22€, which corresponds to a daily value equal to 1,293.45€ and represents approximately 11% of manufacturing costs. As such, it is possible to verify that overhead costs have a high impact in the total costs supported by the company. In order to take decisions on pricing activities, Sabalar adds the daily value of non-manufacturing costs to the production runs of that day and, if more than one product is manufactured, the allocation is based on the sales revenue of each product. Exhibit 1 provides all the detailed calculations according to this costing system.

Homogeneous Cost Pool Method at Sabalar

When Mr. Júlio Videira initiated its activity as Sabalar's CEO in 2001, the inaccuracy of the implemented costing system was one of the problems he faced and, according to Mr. Videira, Sabalar was considered to have "good but expensive products". The system used at that time was the single overhead rate but less developed than it is nowadays due to the inexistence of HACCP at that time and, consequently, less steps in the process. As such, Mr. Videira managed to implement a new system that could fit the characteristics of the company and satisfy the new needs of the HACCP system. So, the homogeneous cost pool method was considered a good method and, at the same time, not too complex. Mr. Videira adapted the method to the company so that it could be operating as fast as possible in order to give the realistic cost of each production run. This change Mr. Videira wanted to implement was "reflect(ing) a concern for economic efficiency and cost control" (Burns & Scapens, 2000, p. 12), which was a consequence of the increasing global competitive environment in the industry.

Despite Mr. Videira's efforts in this project, the new system was only applied for a couple of months. One of the most important factors was the resistance from the workers in the factory "promoted by fear of increasing workloads" (Angonese & Lavarda, 2014, p. 16) since they had to

provide additional information to the management team such as cooking times, water consumption in the kitchen, exact time in the casting activity and the correspondent number of codfish fritters and other details. This additional information was wrong most of the times as employees usually forgot or had no time to record the information in the right moment, which led them to make wrong estimates. Employees stated they have to perform a lot of activities in sections in the right moment in order not to decrease the quality of the product and, as such, it was too difficult to record information at the same time.

Furthermore, Mr. Videira was not totally supported by other managers as they perceived the new system as not adequate to Sabalar. According to the Quality Director:

“The production implies high mobility of workers between sections which makes it very difficult to correctly assess the costs of each cost pool. Also, workers tend to rush the process of record of information and we end up with wrong data. All this complexity caused a big waste of time in feeding the system. I recognize that the current system is not totally accurate but it is possible to get a range of costs for products.”

In exhibit 2 it is possible to see part of the homogeneous cost pool method applied at Sabalar in 2001, using the current costs.

Discussion Questions

1. Based on the description of the current costing system used at Sabalar, the production process for different products and the theoretical framework for traditional costing systems:
 - 1.1. Identify the best allocation basis among the two stated in the single overhead rate method and discuss theoretically if there might be any cross-subsidization of products in both cases. Give examples to justify your answer.

2. Do you consider that it is worth to Sabalar to improve its costing system/implement a new one? What are the most important factors that support your advice?
3. Considering the current costing system, calculate the cost of one production run of codfish fritters (to be sold to restaurants) that lasts 4 hours, assuming that 270 boxes are manufactured, and the correspondent cost per codfish fritter. Use the information of exhibit 1. (Note: The price of codfish has already been doubled to account for the codfish preparation and storage).
4. Assuming that Sabalar will implement the homogeneous cost pool method:
 - 4.1. Consider the production run of question 3 and calculate again the unit cost and the cost of the production run using the new method. Note that you have to use the original price and quantities bought of codfish (assume a waste rate of 30%). Also, note that raw materials are prepared in the previous day and, for that reason, the sections of chipping and mechanical mixture work for 8 hours whereas the other sections work 4 hours each in the process. Moreover, Dr. Júlio Videira has found that, besides the costs already computed, the daily storage costs of materials needed for the production of 530 boxes of codfish fritters are 59.66€ (refrigeration and other costs related), which will be allocated based on the value of materials purchased. Also, the daily storage costs of finished goods are 61.36€, for a production of 530 boxes, comprising the palletizing costs, internal warehouse costs and external warehouse renting, when the company does not have storage capacity, allocated based on the amount of final production. Conclude about the accuracy of the system currently used at Sabalar.
 - 4.2. What is your advice in order to guarantee a successful implementation of the system and avoid, for example, the resistance from workers?

EXHIBITS

Exhibit 1 Current Costing System at Sabalar

Notes:

1) The following cost structure is associated to a production run of 530 boxes which corresponds to 63,600 codfish fritters.

2) These values do not truly represent the costs incurred by Sabalar in a production run.

<i>Direct Materials</i>	<i>Price</i>	<i>Quantity</i>	<i>Daily Cost</i>
Codfish: <i>Morhua</i>	11.00 € /kg	480 kg	5,280.00 €
Codfish: <i>Macrocephalus</i>	9.00 € /kg	160 kg	1,440.00 €
Potato	0.45 € /kg	1000 kg	450.00 €
Potato Flakes	1.30 € /kg	450 kg	585.00 €
Pasteurized Egg	1.40 € /l	300 l	420.00 €
TOTAL			8,175.00 €
Total per unit			0.1285 €

<i>Indirect Materials</i>	<i>Price</i>	<i>Quantity</i>	<i>Daily Cost</i>
Onion	1.10 € /kg	40 kg	44.00 €
Codfish Cream	6.20 € /kg	25 kg	155.00 €
Flavour Enhancer	2.40 € /kg	20 kg	48.00 €
Garlic	1.65 € /kg	10 kg	16.50 €
Rusk	1.15 € /kg	10 kg	11.50 €
Salt	2.00 € /kg	8 kg	16.00 €
Parsley	9.20 € /kg	5 kg	46.00 €
Pepper	10.00 € /kg	1.5 kg	15.00 €
TOTAL			352.00 €
Total per unit			0.0055 €

<i>Packages to Retail Industry</i>	<i>Price</i>	<i>Quantity</i>	<i>Daily Cost</i>
Boxes RETAIL	0.35 € /un	530 Un	185.50 €
Small packages	0.035 € /un	6360 Un	222.60 €

Roll of Film	5.00 € /kg	35 Kg	175.00 €
TOTAL			583.10 €
Total per unit			0.0092 €

<i>Packages to Hotels, Restaurants and Catering</i>	<i>Price</i>	<i>Quantity</i>	<i>Daily Cost</i>
Boxes HORECA	0.33 € /un	530 Un	174.90 €
Plastic Bags	0.03 € /un	530 Un	15.90 €
TOTAL			190.80 €
Total per unit			0.0030 €

<i>Direct Labour</i>	<i>Yearly cost</i>
Number of employees	21
Wages	157,500.00 €
Meal Allowance	25,447.48 €
Social Security	57,109.85 €
Christmas pay	15,957.16 €
Holidays pay	12,737.74 €
Bonus	11,698.76 €
Extra hours	783.86 €
Total yearly value paid	281,234.84 €
Hourly wage rate per employee	6.34 €
Total daily wage rate	1,065.28 €
Wage rate per unit	0.0167 €

<i>Variable Manuf. Overheads</i>	<i>Daily Cost</i>
Electricity	12.50 €
Water	110.00 €
Gas	200.00 €
Nitrogen	530.00 €
TOTAL	852.50 €
Value per unit	0.0134 €

<i>Fixed Manuf. Overheads</i>	<i>Yearly cost</i>
Wages	37,900.00 €
Meal Allowance	6,123.55 €
Social Security	13,742.62 €
Christmas pay	3,839.85 €
Holidays pay	3,065.14 €
Bonus	2434.15 €
Extra hours	188.62 €
Maintenance and others	85,150.00 €
Total yearly value	152,443.94 €
Total daily value	577.44 €
Value per unit	0.0091 €

<i>Non-Manufacturing Overheads</i>	<i>Yearly cost</i>
Wages	85,900.00 €
Meal Allowance	13,878.97 €
Social Security	31,147.53 €
Christmas pay	8,702.99 €
Holidays pay	6,947.12 €
Bonus	15,867.10 €
Extra hours	427.52 €
Flexible working hours	13,800.00 €
Vehicle maintenance	15,000.00 €
Financial costs	55,000.00 €
Depreciation & Amortization	52,750.00 €
Others	42,050.00 €
Total yearly value	341,471.22 €
Total daily value	1,293.45 €
Value per unit	0.0203 €

Source: Adapted from (Sabalar, Internal Documents, 2015)

Exhibit 2 Homogeneous Cost Pool Method at Sabalar

	PRODUCTION COST CENTERS								SERVICE COST CENTERS	
	<i>Dosing</i>	<i>Codfish desalt</i>	<i>Chipping</i>	<i>Mechanical mixture</i>	<i>Casting</i>	<i>Deep freezing</i>	<i>Packaging</i>	<i>Metal detection</i>	<i>Maintenance</i>	<i>Cleaning</i>
Yearly overhead costs (€)	12,217.34	15,000.00	31,124.98	76,492.24	201,182.00	155,170.00	27,084.28	16,642.14	89,002.01	34,824.59
Monthly overhead costs (€)	1,018.11	1,250.00	2,593.69	6,374.35	16,765.17	12,930.83	2,257.02	1,386.85	7,416.83	2,902.05
Maintenance (%)	-	-	-	13	-	50	20	17	-	-
Cleaning (%)	8	5	20	23	25	12	5	2	-	-
Allocation Base	DLh ⁶	DLh	DLh	DLh	DLh	Mh ⁷	DLh	Mh	DLh	DLh

Note 1: These values do not truly represent the costs incurred by Sabalar in a production run, they are merely representative. The costs and proportions of allocation of costs were computed based on direct observation of the production process and on the explanations of the team responsible for assessing the costs of each run.

Note 2: Consider that each department works 8 hours per day and 22 days per month.

Source: Adapted from (Sabalar, Internal Documents, 2015)

⁶ DLh – Direct Labour Hours

⁷ Mh – Machine Hours

DISCUSSION NOTE

Case Overview

When Mr. Videira became part of Sabalar in 2001 he was confronted with the inaccuracy of the implemented costing system, which was based in the use of a single overhead rate. As such, he tried to implement the homogeneous cost pool method but the process faced a lot of resistance, particularly from employees in the factory, and the system was abandoned some months later. Nowadays, Mr. Videira is considering a new attempt to implement the same method in order to get more accurate costs of production runs for the products manufactured at Sabalar. Nevertheless, Mr. Videira fears increased costs of measurement and that employees continue to resist to this change, which might harm the business activity of the company. As such, advantages and disadvantages of this new system need to be considered in order to assess if it is worth or not to pursue this change.

Teaching Objectives

The final objective of the presented teaching case study is to be used in management accounting courses in the masters' program such as Managerial Accounting and Management Control Systems, when discussing the topic of traditional costing systems. This case study can be analyzed and discussed in class or, alternatively, it can be a homework assignment, where the final outcome should be a report with the analysis and proposed solution for the problem posed. After the discussion of the teaching case study, students should be able to:

- 1) Understand the importance of a precise and accurate costing system in a manufacturing company, producing a high variety of products;
- 2) Discuss the advantages of homogeneous cost pool method;

- 3) Recognize the problems that may arise in a simple costing system when the proportion of overheads is relatively high and the company is producing different products;
- 4) Identify cross-subsidization as one of the most serious problems in a company that manufactures products with different complexity;
- 5) Recognize the importance of acceptance to changes by the labour force to the successful implementation of a new costing system.

Case Analysis

1.1) Sabalar uses a single overhead rate to assign indirect costs to products and it has used two different allocation bases during its existence, both volume-based allocation basis: the number of units produced and the number of direct labour hours. In fact, the level of difficulty and complexity of production varies according to the type of product, which leads to different consumption of resources among them. For this reason, if products with different complexity are manufactured during one working day, the utilization of the number of units produced as allocation basis does not seem appropriate. For example, if Sabalar manufactures two products in a specific day, spending 4 hours in each one, with final production of 30,000 codfish fritters and 70,000 shrimp turnovers, the total will be 100,000 units produced. If the number of units produced is used as the allocation basis, only 30% of the total overheads of that day will be allocated to the cost of the production run of codfish fritters whereas 70% of the overheads will be allocated to the run of shrimp turnovers. Considering that the number of labour hours used in each run is equal, this specific allocation of overheads does not seem correct as it cannot be considered a cause-and-effect allocation and a situation of cross-subsidization arises. This particular situation exemplifies the fact that high volume products (shrimp turnovers) tend to subsidize low volume products (codfish fritters) since codfish fritters would receive a small

proportion of overheads and shrimp turnovers would be considered to be much more expensive than they are in reality given the high proportion of total overheads allocated in relation to the time spent in its production. Considering this situation, it seems to be more reasonable to divide the value of overheads equally between the two production runs as the number of workers and the time spent in each run was equal. So, the usage of direct labour hours as an allocation basis seems more appropriate. Nevertheless, it is also important to note that turnovers are molded by machines whereas codfish fritters are molded manually, which will affect the usage of resources by each production run. As such, it is possible to conclude that an equal division is also not the most accurate rule and might also not be a cause-and-effect allocation given the cost structure and production characteristics at Sabalar. However, by comparing both cost drivers, the direct labour hours seems much more reliable than the number of units produced as it leads to a better allocation of manufacturing overheads and substantially reduces the cross-subsidization between products, given the different characteristics of products.

2) Depending on the characteristics of the production of a certain company and its cost structure, it might be extremely important to have an accurate costing system or not. For example, when the proportion of indirect costs is very small, it is not worth to implement a very detailed costing system and, in these situations, usually a direct costing system is applied, a system that only assigns direct costs to cost objects (Drury, 2015, p. 46). Nevertheless, when analyzing the production characteristics at Sabalar, a direct costing system is not appropriated given the high proportion of manufacturing overheads (12% of total manufacturing costs) and non-manufacturing overheads (10% of total costs).

When taking a closer look to the products manufactured at this company, it is easy to identify a high variety of products that have different production processes and complexity levels.

Besides that, it is not observable in which extent the high proportion of overheads is caused equally by all products or not, despite the sequential production process instead of simultaneous. This might lead to wrong decisions as situations of cross-subsidization might arise and, consequently, managers might decide to alter the product mix or abandon one product based on misleading product costing information.

In order to take strategic decisions of product-mix or products to abandon, it is extremely important to have a detailed and correct allocation of overheads to each product. Given this and the fact that the current costing system used at Sabalar consists in arbitrary allocations, it is essential to improve the existing system or implement a new one.

3) In order to assess the total cost of the production run we need to take into account direct and indirect materials, direct labour and manufacturing overheads. Since the price of codfish has already been adjusted for the preparation of raw materials, there is no need to compute the cost of that preparation. Also, it is important to note that the costs presented in exhibit 1 are the costs incurred for the production of 530 boxes of codfish fritters and considering that only one product is manufactured during that working day. As such, the cost for this different situation need to be assessed. Concerning direct labour, employees spent only half of the day in the production of codfish fritters. When looking to manufacturing overheads, the single overhead rate needs to be used considering the number of hours in the production run in analysis, 4 hours.

<i>Type of cost</i>	<i>Cost of the Production Run</i>	<i>Calculation</i>
Direct and Indirect Materials	4,343.94€	(8,527.00€ / 530bx * 270bx)
Packages for restaurants	97.20€	(190.80€ / 530bx * 270bx)
Direct Labour	532.64€	(1,065.28€ / 8hr * 4hr)
Variable Manufacturing Overheads	426.25€	(852.50€ / 8hr * 4hr)
Fixed Manufacturing Overheads	288.72€	(577.44€ / 8hr * 4hr)

TOTAL	5,688.75€	-
Total per unit	0.1756€	-

4.1) As in the previous question, we need to consider all the costs associated with the production run, considering instead the details of homogeneous cost pool method. First of all, direct materials need to be considered but with the initial price and quantities bought of codfish. The initial price is half of the price considered in the current system in use and the initial quantities bought considering a 30% waste rate (for the production run of 530 boxes, it corresponds to approximately 685.71kg of *Gadus Morhua* for a price of 5.50€/kg and 228.57kg of *Gadus Macrocephalus* for a price of 4.50€/kg). So, for a production run of 530 boxes, the total amount paid for codfish is 4,800.00€ and the total amount of direct materials is 6,607.00€, which will correspond to 3,365.83€ for this particular production run. Also, we need to compute the storage costs both for materials and finished goods, allocating the first based on the amount of materials bought and the second one based on quantity of codfish fritters produced. Taking into account the direct labour and manufacturing overhead costs, the homogeneous cost pool is applied as it is possible to check in page 24.

<i>Type of cost</i>	<i>Cost of the Production Run</i>	<i>Calculation</i>
Direct and Indirect Materials ⁸	3,365.83€	(6,607.00€ / 530bx * 270bx)
Storage costs of materials	30.39€	(59.66€ / 6,607.00€ * 3,365.83€)
Packages for restaurants	97.20€	(190.80€ / 530bx * 270bx)
Conversion costs ⁹	1501.68€	(page 24)
Storage costs of finished products	31.26€	(61.36€ / 530bx * 270bx)
TOTAL	5,026.37€	-
Total per unit	0.1551€	-

⁸ The indirect materials are used in the production process and not for commercial or administrative functions.

⁹ Conversion costs are the sum of direct labour costs and manufacturing overhead costs.

After the computation of the production run cost with the homogeneous cost pool method, it is possible to conclude that it is very different from the one achieved with the current system, which allows us to conclude that the current system is not as accurate as it should be, leading to errors in the pricing activity. This error is caused mainly by the assumption that the codfish preparation and storage doubles its price, which is not exactly true. So, it would be beneficial to Sabalar to change the costing system to the homogeneous cost pool method once again as it would result in a more accurate cost per unit of codfish fritters and establish prices accordingly.

4.2) Resistance to change has always been an important subject at Sabalar due to the highly institutionalized routines, since “the more widely and deeply the institution is accepted, the more likely it is to influence action and to resist change” (Burns & Scapens, 2000, p. 11). Also, the system that Mr. Videira tried to implement consisted in revolutionary change that “entails a fundamental challenge to the existing routines” as stated before (Ahmed & Scapens, 2000, p. 168). Despite the belief that “stability and change are not mutually exclusive processes” (Burns & Scapens, 2000, p. 22), according to Lukka (2007, p. 98) “informal routines can also act as the ‘protecting’ device [...] shielding them from pressures for change” and “leading to situations of loose coupling¹⁰” (Dambrin et al., 2007, p. 202), which translates the issue in the present case of resistance from workers. Also, according to Steen (2011, pp. 503-504), “the complex nature of routines can provoke change in routines themselves” as they are “part of social structure”, leading to constantly wrong estimates of manufacturing overhead costs. As such, in order to solve this situation and make change easier, the first step to take is to introduce new formal rules, as they are “one of the most powerful ways in which management can induce behavioural changes”

¹⁰ Loose coupling – “Well-developed and flexible informal routines and knowledgeable actions by the organisation’s participants had the capacity to smooth the frictions of the formal rule systems related to management accounting, saving them from pressure for major change” (Lukka, 2007, P.76).

(Steen, 2009, p. 757). Nevertheless, it might not be enough as “new rules can also introduce ambiguity and [...] retain existing behaviours” (Steen, 2009, p. 757). Considering this fact, it might also be useful “recruiting people who have previous experience” (Dambrin et al., 2007, p. 201), namely in the implementation of the homogeneous cost pool method and in the routines that arise with this new system. With these new external factors, workers will be pushed to implement the new routines and the possibility of success increases as “revolutionary change is likely to be possible only as a result of major external change” (Burns & Scapens, 2000, p. 13). However, more measures need to be taken since “institutionalization does not occur through the simple imitation of an action by immediate observers” (Phillips et al., 2004, p. 639).

Another measure that needs to be implemented is the explanation of the new routines to workers as being simple and only slightly different from what they are doing now, so that they do not resist to the new rules for fear of instability, because “change seems able to develop only if some practices [...] remain stable” (Dambrin et al., 2007, p. 204). Also, the abovementioned measure is necessary to break the rigidity of current routines and separate them from the new ones as, according to Steen (2009, p. 757), “ambiguity and contradictions” are considered “the dominant sources of inertia” and inertia is a major threat to change that “can emerge as a consequence of the introduction of new management accounting rules” (Steen, 2009, p. 757).

Another possible solution to this problem is the implementation of a success fee, similar to the incentive in the casting activity, that rewards employees based on the use of the information in decision making (SM-U – measure based on the use of information), which is a measure commonly used to evaluate the success of an implementation (Foster & Swenson, 1997) and a symbol of the quality of information provided by employees.

Question 4.1) Manufacturing overhead costs

	PRODUCTION COST CENTERS								SERVICE COST CENTERS	
	<i>Dosing</i>	<i>Codfish desalt</i>	<i>Chipping</i>	<i>Mechanical mixture</i>	<i>Casting</i>	<i>Deep freezing</i>	<i>Packaging</i>	<i>Metal detection</i>	<i>Maintenance</i>	<i>Cleaning</i>
Yearly overhead costs (€)	12,217.34	15,000.00	31,124.98	76,492.24	201,182.00	155,170.00	27,084.28	16,642.14	89,002.01	34,824.59
Monthly overhead costs (€)	1,018.11	1,250.00	2,593.69	6,374.35	16,765.17	12,930.83	2,257.02	1,386.85	7,416.83	2,902.05
Maintenance (%)	-	-	-	13	-	50	20	17	-	-
Cleaning (%)	8	5	20	23	25	12	5	2	-	-
Allocation Base	DLh	DLh	DLh	DLh	DLh	Mh	DLh	Mh	DLh	DLh
Reallocation of maintenance costs (€)	-	-	-	964.19	-	3,708.42	1,483.37	1,260.86	-	-
Reallocation of cleaning costs (€)	232.16	145.10	580.41	667.47	725.51	348.25	145.10	58.04	-	-
Total per month (€)	1,250.28	1,395.10	3,174.10	8,006.00	17,490.68	16,987.50	3,885.49	2,705.75	-	-
Total per hour (€)	7.10/DLh	7.93/DLh	18.03/DLh	45.49/DLh	99.38/DLh	96.52/Mh	22.08/DLh	15.37/Mh	-	-

Conversion costs of the production run:

<i>Dosing</i>	<i>Codfish desalt</i>	<i>Chipping</i>	<i>Mechanical mixture</i>	<i>Casting</i>	<i>Deep freezing</i>	<i>Packaging</i>	<i>Metal detection</i>	<i>TOTAL</i>
7.10€ * 4DLh 28.40€	7.93€ * 4DLh 31.72€	18.03€ * 8DLh 144.24€	45.49€ * 8DLh 363.92€	99.38€ * 4DLh 397.52€	96.52€ * 4Mh 386.08€	22.08€ * 4DLh 88.32€	15.37€ * 4Mh 61.48€	1501.68€

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